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Investování do vína

Investment in wine

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2. Literature Review
3. Methodology
4. Findings and Results
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Bibliography
List of Abbreviations
Declaration of Utilisation of Results from the Bachelor Thesis
List of Annexes
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ABSTRACT

After 2007-2009 market shocks an investor cannot fully rely on financial asset market and to diversify his portfolio tends to choose the alternative investments.

This work aims to test the hypothesis if investments in fine wine can be considered as alternative investments. Also provides evaluation of risks and returns flowing from this asset.

Fine wine market is small, there are no instruments for prediction of its development and investor must rely on constructing trends from foregoing data. Historical data are used in this research as well.

The hypothesis is tested by series of calculations as well as risks and returns evaluation. Also the issue of fine wine investments is then discussed with two specialists from investment in fine wine area.

The research came to the conclusion that wine definitely creates an alternative asset class, however there are differences in risks and returns among individual types of fine wines. The most profitable ones are Champagne and red Bordeaux from 24 largest producers, nevertheless these ones are also the riskiest.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

1. INTRODUCTION

Contemporary democratic system is unstable and as Hyman Minsky (BBC, 2014) said: "Stability is destabilizing."

Wealthy investors always rely on investing in emotional assets and nowadays after market shocks from years 2007-2009 it is again important to diversify the portfolios and hedge investments against inflation. These assets as art or rare alcohols namely tend not to lose its value during hard times and that is why they are so popular in emerging markets - to protect money against shocks and instability in places where financial markets are not so developed as in the United States and Western Europe.

This work firstly gives the reader background to understanding investments at all and defines main features of emotional investment. Moreover also defines investor's motives for holding these kinds of assets and discuss their risks and returns. Hypothesis of emotional assets as alternative assets is introduced. Fine wine is classified as emotional asset as well, so chapter 1. Literature review in its last part provides necessary background for investment in fine wine with all its risks, returns and possibilities how to invest properly. Hypothesis of wine itself as alternative asset class in first chapter becomes clearer.

Secondly the instruments for the evaluation of risks, returns and coefficient of correlation are introduced as quantitative analysis factors. Coefficient of correlation is important part of secondary data analysis because represents an instrument due to which is possible to figure out the relationship among assets. In case that wine represent alternative asset class, it should show weak or negative correlation with the other assets. For this research the correlation among wine and FTSE indexes and correlation among wine and inflation are measured. To support secondary data analysis two interviews as qualitative analysis are held with specialists from investment in fine wine area. Questions are related to risks and returns of fine wine investments and how the price of wine can be affected.

Mixed-methods research in this case avoids the limitations of both secondary data analysis and qualitative data analysis, moreover combines both analytical and human approach.

Finally the findings are presented numerically and graphically, also the interviews are attached in the last chapter, chapter 3. Findings and results. Moreover this final chapter concludes the discussion of all results observed by both research methods.

2. LITERATURE REVIEW

The following chapter literature review introduces the meaning of investments both in real and financial assets, and specify investing in emotional assets. Further is described who actually the investor in this kind of assets is and what are his motives for investing in emotional assets. Middle section of literature review observes the potential of emotional assets as the hedge investments to lay the groundwork for further research in this work. Last section construes the background of investment in wine especially.

2.1 Nature of investing

Investing is what individuals, corporations or governments do with their savings to increase their volume in time. The amount by which the investment should increase is the expected rate of return. It is inefficient when individual or firm holds a big amount of money on bank account because in time money loses its value due to inflation. Investments are both when a firm buy some new machines and when a family decides to buy a new house because in both cases there is or could be a creation of new money/return after some period. In case of firm there are sales revenues and in case of household the profit which rises in time when the family decides to sell the house. The risk is when real return varies from expected return or when there rises a loss from the investment. For instance when there is low demand for products created by new machine or the features of the location, where the house is standing, change dramatically due to high criminality or worsen environment in view of an industrial zone nearby. In managing investment we could avoid some risks by calculating the probability of risk and by measuring the expected return according to historical data (Reilly & Brown, 2005; Rutterford, 2007).

2.2 Definition of assets and difference between real assets and financial assets

By investing an investor buys the assets. Best explanation can be obtained by scanning an ordinary balance sheet which shows what the investor has and how his possession is

financed. In the balance sheet the assets are opposite to the liabilities which means that assets are something what the investor owns and what brings him some utility. Liabilities are opposite assets something what the investor owes to other corporation, state or institution but also it could be simply the financial source of wealth (Bodie et al., 2005).

2.2.1 Real assets

According to Bodie et al. (2005) there are two main groups of assets – the real assets and the financial assets. The real assets are assets in their physical form such as properties, machines or even knowledge as a human asset because without knowledge or know-how the goods on the machines cannot be produced. For instance the students have some education which is their real asset and kind of investment from which they will have profit in their future job and life, and this education is covered by student loan which creates a liability in their private balance sheet. When summarized, the real assets are something what creates value by producing goods or it could be the goods itself before we sell it, the real assets are in most cases something we can touch but it could be even the knowledge or some hidden factor which is need to produce goods, provide services or just to be good in an employment.

2.2.2 Financial assets

The financial assets are much less tangible than real assets. It is said: "These assets per se, do not represent a society's wealth. Shares of stock are no more than sheets of paper or, more likely, computer entries and do not directly contribute to the productive capacity of the economy" (Bodie et al., 2005, p.4).

That though does not mean that they are less important. Financial assets represent investor's claims on financial profit of the company, government (bonds) or the other organization. The most often traded financial assets are shares and bonds. When an investor buys shares, the company, which issued shares, receives money from this transaction to realize its real investments - for instance in new machines or in courses for employees. However for the company means issuing shares creating a "debt" towards the

investor. In the company's balance sheet these issued shares are resources – liabilities while on the investor's balance sheet they are assets because company pays the dividends from its income generated by real investments. For example when the investor or a group of the investors buy shares of General Electrics in nominal value £ 10,000 the GE will invest this amount in time-management course for its employees. The employees then will become more efficient and it will display in company's profit from which the dividends will be paid. In case of investing in new machine for car manufacturing the GE could decrease its fixed costs by economies of scale or produce more cars and increase its profit as well (Bodie et al., 2005).

Definitely the investing in financial assets is providing capital to companies, governments and other organisations for purposes of appreciation of our savings. As Rutterford states:

> *This distinction between financial and real assets follows the distinction drawn in classical economics between product markets and factor markets. In product markets goods and services are distributed to their end-users. In factor markets the two inputs into the production process – labour and capital – are bought and sold. Financial assets are traded in, and created by, the market for capital (Rutterford et al., 2007, p.5).*

Nevertheless is important that financial assets are assets as well so there is need to mention risk. Every time an investor buys shares or bonds there is some possibility that returns may vary from what is expected. The corporation could have troubles – production decrease and the loss could cause the firm unable to repay its commitments what is called the default risk, social unrest in the country or economic recession could cause the downfall in share prices due to inflation so an investor can lose the savings overnight (Rutterford et al., 2007).

Financial assets are purchased on financial markets, namely for instance on stock exchanges which are speculative and organized market, but also by over-the-counter (OTC) form of trade where the corporate bonds are traded via "bond dealer" who directly sells the bonds to the investor (Arnold, 2010). When the investor want to become a part of stock exchange, he should pay a fee so it is obvious that not anyone can join this market. As Challe says: "A natural explanation for incomplete market participation is that

investors have to pay entry costs, which reflect fees, information-gathering costs, processing costs and the like, before they can convey buying or selling orders to the market" (Challe, 2008, p. 2149).

2.2.3 Emotional assets

It is distinct that more investors can invest in real assets than in financial assets. Even a small company which does not have ambitions to issue its own shares usually has at least one machine on which produces its products, computers to do administration or at least one worker to provide its services. Investment in wine is investment in real assets so almost anyone who has some spare savings can invest in wine which together with antiques, jewellery, stamps, collectibles, art or old musical instruments creates the emotional assets class (Dimson &Spaenjers, 2014).

The emotional assets are described in various ways, for Dimson & Spaenjers (2014) these assets are luxuries or rare goods which is held mainly by high-net-worth investors, while Zolfagarian & Cortes (2011) describe emotional assets as artwork, collectibles and antiques towards which has even the middle class of population simple approach.

According to Barclays (2012) there is next perception - treasure assets which are understanding as expensive, rare and high in quality. Nevertheless Zolfagharian & Cortes (2011), Dimson & Spaenjers (2014) and survey by Barclays (2012) is all about the same things. Always are mentioned antiques, arts and collections, there is only one difference - that Dimson & Spaenjers (2014) added luxury goods and survey by Barclays (2012) even precious metals.

The fine wine fits well in each group, both antiques and collections, and according to Coffman and Nance (2009) even creates its own asset class.

Therefore the emotional assets are mostly stamps and the other collections, wine and the other rare alcohol, sculptures, art, luxury, precious metals, old or rare cars, watches, antiques - books, furniture, clothes, bijoux and carpets. What makes them special among the other asset classes is the attitude of the owner. As stated in Pownall et al. (2009) work: "The reasons for investing in such emotional assets goes beyond investment value alone.

They also have a consumption value and provide the owner with greater utility in the form of aesthetic value and can act as a signal of the owner's wealth" (p.2).

According to Barclays (2012) is investment in emotional assets (in the report described as "treasure assets") most held in United Arab Emirates, Saudi Arabia, China, Singapore and Brazil. Report by Barclays (2012) explains it as kind of distrust in financial sector:

> *Although there are exceptions to this rule, one general theme seems to be that respondents from economies that have more volatile or less developed financial markets and high per capita incomes tend to hold higher proportions of treasure in their portfolio (Barclays, 2012, p.3, paragraph 1).*

2.3 Rationale for holding and purchasing the emotional assets

Following part of the literature review evaluates investor's behaviour and gives outline over the reasons for purchasing the emotional assets or holding them alone or in collections. In accordance to Zolfagharian & Cortes (2011) there are 7 motives for buying and holding artwork, collectibles and antiques. They are introduced according to results of Zolfagharian & Cortes's survey among 641 respondents representing average middle class. Conclusion of this sub-chapter discusses the economic motives which are most important in accordance with the objectives of this work.

2.3.1 Normative motives contra social motives

First of all there is "normative motive" of purchasing emotional assets which means that by buying art, collectibles or antiques an investor fit in some group of people (Zolfagharian & Cortes, 2011). But in literature we could meet even social motives which are different from normative motives. As normative motives can be understood that the investor is already a part of some group and he would like to have something more common with this group. For instance when his friends from neighbourhood are keen art collectors, he could tend to buy some art just to have something to discuss with these friends. Unlike social motives are that the investor is not a part of some group of people,

but he is trying to become a part of the group. For instance he wants to be a part of high society so he starts to look for a well-paid job, contacts and to learn how to act among rich people (Carbonara et.al, 2008).

2.3.2 Hedonistic motives and harmony motives

Next couple of motives are hedonic motives which are in fact strongly emotional. Main feature of hedonism is pleasure and enjoyment. The investor holds antiques because it evokes emotions in him. It is a similar case like people buy a chocolate, actually they do not need it, they know there is a plenty of sugar but they buy it just because of the good feeling they have by eating chocolate. However these feelings could not be only positive, people have sometimes pleasure even from feelings like fear by watching a horror movie (Zolfagharian & Cortes, 2011). Third is the "harmony motive" when "the consumers add flavour to their basic, utilitarian activities and to enjoy a more balanced life style" (Zolfagharian & Cortes, 2011, p.32). Because some people like spending their spare time in society of their collection like creating new models of little trains of repairing broken old furniture.

2.3.3 Rational, economic and the other motives

Sometimes the buyers are holding the artwork or rare wine just to keep it for next generation. They are so curious about some culture so they are looking for anything connected with it. These motives are "intellectual motives" and people like this are helping to keep a part of history alive. Last but not at least are "economic, uniqueness and good cause motives". Uniqueness is related to identity of a human. A buyer want to be different from other people, to be outstanding in his own way and to have idiomatic image. While good cause motives are associated with donation to specific artist who has buyers support (Zolfagharian &Cortes, 2011).

Danet & Katriel (1989) even came with specific motives for purchasing collectibles as completing a set, filling some blank space like a wall or shelf or creating visually good looking space.

This work is about investment what is directly connected to the "economic motive" of holding which means that we hold emotional assets for the purpose of increasing its value in time. To protect investor's saving against inflation by hiding them in art, antiques, collectibles, rare alcohol or classic cars (Burton & Jacobsen, 1999).

It is surprising that economic motives are ones of the last motives according Zolfagharian & Cortes (2011), although their research was observing mainly people of middle class. However report by Barclays from year 2012 observes 2000 people from all over the word and they all are high-net-worth individuals, likewise the report demonstrates that average person with high income has almost 10% of his wealth in emotional assets. Nevertheless as provided in Barclays' survey (2012) even for high-net-worth individuals the first motive of purchasing emotional assets is enjoyment or hedonic motives, normative motives and bequeath this wealth to next generations – as intellectual motive. Only precious metals exhibit only financial motives of holding.

2.4 Illiquidity of emotional assets

The common feature of emotional assets, collectibles and rare alcohols is their illiquidity. Liquidity is a speed in which an asset can be sold and in which an asset change its value into money. There are for instance financial assets as stocks, traded on stock exchange, which can be sold really quickly so it can be said that their liquidity is good and they can be sold directly back to the market. The case of emotional assets and collectibles is slightly different. As illiquid assets it is not easy to sell them immediately. It is possible to sell them indirect in auction or direct to a buyer, but in both cases it could take some time depending of type of item, its age or rarity (Byalinicka-Birula, 2014).

Dimson & Spaenjers say:

> *Auction houses do not hold sales continuously – they need time to authenticate objects, prepare catalogues, and market each sale. They may even be unwilling to sell an item if they believe that it does not suit an upcoming auction or that demand is temporarily depressed. Moreover searching for potential buyers outside the auction circuit can be time consuming and costly (Dimson & Spaenjers, 2014, p.23).*

Now there are many possibilities to sell emotional assets and collectibles out of the auction house. For instance online via eBay where it is possible both to sell and buy and where the investor can find even special category about antiques and collectibles with information about every vendor. The advantage is in lower transaction costs and in comfort. The investor can buy the item directly or become a part of auction and bid money (Jacobsen & Burton, 1999).

The biggest investments in emotional assets are despite of existence of on-line auctions held by the auction houses. For instance in Christie's the lowest prices there starts on 200$ and are going over 100 million $ while on eBay we could buy art for much lower price. In year 2012 Christie's sold emotional assets in value 6.27 billion $ (Christies's, 2013).

2.5 Risks of investing in emotional assets

When considered a painting from some Old Master as Van Gogh or Dürer it is quite unlikely that some of these pieces can be bought on eBay. It is more likely that the buyer finds some bogus. In word of emotional assets it is serious risk of buying false artwork or collectibles and in the worst case something what was stolen from previous owner (Dimson & Spaenjers, 2014).

In every investment there is a risk that realized return in future could vary from what is expected or the loss can rise. Return volatility is therefore also risk of investing in emotional assets – when considered that the investor hold these assets for economic reasons (Dimson & Spaenjers, 2014; Rutterford, 2007). Ang says that "time-varying market volatility induces changes in the investment opportunity set by changing the expectation of future market returns, or by changing the risk-return trade-off. If the volatility of the market return is a systematic risk factor" (Ang et al., 2006, p.259).

Some types of emotional assets or collectibles can in time period go out of fashion and the demand can decrease only because some items are not too favoured as the others. In

minds of people the model of wealth can also undergo changes (Dimson & Spaenjers, 2014).

Moreover the physical risk should be not underrated, because some emotional assets are fragile (wine, paintings), old and "wear out" or could become a victim of vandalism as some old historical buildings. There could some natural disaster or social unrests happen as well and endanger these assets (Bialynicka-Birula, 2014; Hanke, 1996).

Dimson and Spaenjers (2014) also admit that speculative bubbles can rise in investment in emotional assets because not all investors in art and collectibles are financial motivated and sometimes they tend to buy something just because it has some personal value for them and then they are willing to pay much bigger price than is the real value of the investment. Pilbeam says:

> *Speculation is the process of taking on risk in the hope of making a profit. A speculator is a participant in financial markets that assumes a risky or 'open' position in financial securities in the hope of making a profit. For example, if a speculator thinks security A is under-priced and likely to go up in price, he will purchase the security today and if the security goes up in price as he expects he will be rewarded with a profit. However, speculation is a risky business and security A may actually fall in price, in which case the speculator will have to 'close' his position at a lost (Pilbeam, 2010, p.28).*

Likewise Maniatis states:

> *The bubbles are usually considered as results of the psychology of the market, its immanent uncertainty, decision difficulties, or cycles of euphoria and pessimism; and the work that many economists and economic historians have devoted to the speculative bubbles shows that the subject is loaded with intensive convictions and heavy preoccupations in which one can hardly distinguish elements of rationality (Maniatis, 2009, p.123).*

2.6 Returns of emotional assets

Due to investment character of this issue it is also important to include the returns of investments in emotional assets. Dimson & Spaenjers (2014) write only about financial

returns of emotional assets, which consist in changes of value in time and due to demand for these goods. But it seems to be essential to consider also non-financial returns because in accordance to Zolfagharian & Cortes (2011) and Barclays report (2012) it is obvious that people mainly meet their non-financial needs by investing in emotional assets and collectibles.

By making a step back, it is possible to see that by meeting some non-economical motives as hedonic motives, normative motive, uniqueness motives or rational and good cause motives it is possible to reach the non-financial returns as good feeling from fitting better in some social group, aesthetic pleasure and higher self-confidence due to owning something rare and special. An individual can feel the respect he is raising from the status that he owns something luxurious. By creating a collectible there are couple of pleasant feelings connected with refilling the collection (Bialynicka-Birula, 2014).

2.7 Are the emotional investments alternative or hedge investments?

However these returns are mainly psychological and world of investment is rather about making some value added. Burton & Jacobsen put the idea: "In particular, if a negative correlation exists between collectibles and the stock market, or between collectibles and inflation, then investors might be able to use collectibles as hedge investments" (Burton & Jacobsen, 2009, p.200). In Burton & Jacobsen's work the correlation of returns is meant.

Mitchell states: "Alternative investments such as art, antiques, fine wine and vintage cars are becoming increasingly appealing to investors" (Mitchell, 2004, p.1). Which in fact means that according Mitchell's article the emotional assets and collectibles create alternative investments.

Opposite of this viewpoint is argued that "one of the most common ways to determine whether an investment represents a unique asset class is to examine its correlation with other investments" (Kitces, 2012, p.22). Kitces (2012) also states that an alternative asset we could recognize by evaluating its behaviour. If it does not correspond with moods on the market we can talk about alternative asset. The same idea is presented by Bodie et.al (2005).

In accordance to Burton and Jacobsen (1999) and Mitchell (2004) it can be realized that hedge investments and alternative investments are actually the same.

Reilly and Brown by measuring correlation between categories of art/antiques and bonds and stocks state:

> *First, the correlations among alternative antique and art categories vary substantially from above 0.90 to negative correlations. Second, the correlations between art/antiques and bonds were generally negative. Third, the correlation of art and antiques with stocks were typically small positive values. Finally, the correlation of art and antiques with the rate of inflation indicates that several of the categories were fairly good inflation hedges since they were positively correlated with inflation (Reilly & Brown, 2006, p.95).*

It remains quite doubtfully if investments in emotional assets creates a hedge against inflation and market movements. Moreover Reilly and Brown (2006) examined that some categories of art and antiques create the hedge against inflation. Is it then possible that wine creates also the hedge or is it more similar to the "normal" investments as shares and bonds?

Worthington & Higgs (2004) states that in art market exists both low correlation among individual pieces of art and also low correlation art and financial assets. When this statement is actual in world of art, there is a probability that different correlations will be among different emotional assets or even among different wines.

2.8 Investment in wine

Following sub-chapter provides the industry background to one specific kind of investment in emotional assets which is wine. Namely states the meaning of investment grade wine, then discusses the options of investor while considering the investment in this kind of asset and finally evaluates the risks and returns flowing from investing in wine. The conclusion provides view over the theory of wine as alternative investment.

2.8.1 Good wine and investment grade wine

Investment in wine, and investment in emotional assets or collectibles as well is, as examined in previous parts of literature review, unique among other financial or real investments. Let us focus on wine which is the main subject of this research. The efficiency of financial investment we can recognize or predict from series of key figures as dividend yield or price and earnings ratio (Rutterford, J., & Davison, M., 2007). In the case of wine there are not any special key figures and in the case of other emotional assets as well.

How can the investor recognize good wine then? Actually the taste should be unique combination of sweetness, acidity and aroma. This combination can be reached during the process of grape growing when the producer is lucky with the weather and species of vines. However to have a good wine does not mean to hold an investment grade wine. Quality is only one of the features. The investor should be able to provide good trading history of the bottle and evidence of storage and transportation. Moreover the situation can occur when the investor decides to invest in wine through wine fund, therefore he can never see his bottles of wine because they are held in specific condition of storage. In the cellar or warehouse with specific temperature, humidity levels and lighting – or with UV lighting but always in dark bottles. With such a specific storage conditions are connected costs. That is why some investors tend to invest in wine via wine funds which are discussed later in this chapter (Buckley, K. 2008; Coffman, B.A., & Nance, R.J. 2009; Jones & Storchmann, 2001; Ashenfelter, O. 2007).

2.8.2 Possibilities of investment in wine

Nevertheless not every investor is also the specialist or wine taster. There are numbers of investors who only want to diversify their portfolio. So they can choose how to invest in wine. First of all they can hold their own collection and database of wines. Moreover number of specialists could help them with selection of wine. For instance Robert Parker created the ranking system called The Wine Advocate Rating System which evaluates

wines in the scale from 50 to 100 points. Investment grade wines should have at least 94 points (Parker R., 2015; Coffman, B. A., & Nance, R. J. 2009).

The other option is investing in wine via wine fund which operates on the same base as mutual funds, but does not invest investor's money in bonds or stocks, but invests them in wine. The process is that when the investor invest in wine funds, the managers of funds keep some percentage of invested amount for themselves and the rest invest in wine portfolio. These funds also take some percentage of returns (Redhead K., 2003).

As we have the futures among commodities, there are also wine futures which work on similar principles as normal futures contracts. It means that by this contract we will "lock" the future price and quantity of wine which should be produced. For the wine producer it means stable cash-flow and for the investor it is assurance that he will buy his wine for the price known in advance (Coffman, B. A., & Nance, R. J., 2009; Redhead K., 2003).

2.8.3 Returns from investment in wine

From wine the investor does not receive any dividends. Emotional assets bring to the investor mainly good feeling and then some financial profits when the value changes in time. As Sanning et.al (2006) argue there is some opportunity in maturity of wine. Investment grade wines especially can take decades to mature. The investor can only once open his twenty years old bottle of wine and drink it, so this moment is in accordance to Sanning et.al (2006) one of the most valuable ones. This detail is worth to mention, while beauty of art or the sculptures we can adore many times, the unique taste of some extraordinary wine we feel only once because every investment grade bottle is an original or something uncommon.

2.8.4 The risks of investment in wine

The risk of this investment is the investment grade wine market itself. Only few strong wine producers are leading the market which is due to this situation not big enough. Moreover the investment grade wine market is global so is also sensitive to currency

fluctuations. For instance nowadays, in the middle of January 2015, we can examine that USD is on the highest level in ten years, for the wine investors it means that if they had invested in French wines, then the value of their investments has decreased, however an US investor could buy more wine. The French investor could celebrate because his investments in Californian wine have increased with the foreign currency. The investor can also become a victim of the fraud which means that in the bottle is something different from what is written on documents added to the bottle. It is known that this problems happen even in big auction houses as Sotheby's. Furthermore the risk of theft or damage during transportation or storage is the same as by the other emotional assets and collectibles (Coffman, B. A., & Nance, R. J., 2009; Casa, A. D. et.al 2013; Buckley, K. 2008; Evans, R. 2015).

2.8.5 Wine as alternative asset

Many investors are attracted by wine to diversify their portfolio. It is stated that "wine returns were shown to covary minimally with market returns and other commonly accepted risk factors" (Coffman, B.A. & Nance, R.J., p.67).

Covariance is important in diversifying the portfolio as well as correlation because it both show how the investments move together or how an asset and the market move together. Negative or minimal covariance provides opportunities to diversify the portfolio (Reilly, F. K., & Brown, K., 2005).

And Coffman & Nance also admit that: "Wine is not often correlated with equity markets" (Coffman, B.A & Nance, R.J., 2009, p.67). The same output is distinct from Casa, A.D. et.al work.

Erdos, P., & Ormos, M. (2013) agree with these statements and add that wine prices are resistant against recession and create a hedge against inflation. On the other hand Masset, P., & Weisskopf, J. P. (2010) found out that during the worst period of the financial crisis in 2008 the correlation between wine and the other assets increased extensively. Maybe are these investments good choice only in stable time of the economy, however this does not explains low covariance and correlation. How actually does wine act during some smaller recessions and market fluctuations? And why the correlation during the crisis

increased? Can we also count with wine as with alternative asset which creates the hedge against inflation? These questions are investigated in the further research within the next chapters of this work.

3. METHODOLOGY

The objective of this research is to investigate if investment in fine wine creates the hedge investment and shield against recession as well. Moreover this work aims to evaluate risks and returns of wine investments, because these two factors are crucial for investor's decisions.

Firstly in this chapter is the philosophical concept of own research introduced and strategy for obtaining the data explained. Then the features and creation of data is presented and instruments for evaluation of risk and return introduced.

If an investment creates the hedge there is need to put returns from this investment in correlation with inflation or with other financial assets which are closely related to moods on the market. Therefore in this chapter is introduced the coefficient of correlation as instrument used to evaluate the relation among wine prices, inflation and development on London Stock Exchange.

3.1 Research approach

This sub-chapter explains the relation among observer and issue on philosophical basis which creates the root for understanding an observed idea. Moreover introduces the philosophical approach taken and explains why in this research not any new theory is created.

3.1.1 Research philosophy

Behind every research there should be appropriate research philosophy. Since the researcher knows what issue is going to be investigated, then is right time to start thinking about which philosophical approach to take. Then this can help the researcher by showing him the next steps of his research and he can add more research specifications and

continue in his work according to research philosophy chosen. In fact the research philosophy is about the relationship between what is observed and the findings (Blumberg et al., 2014). Research philosophy also determines the relation between the researcher and the issue examined and the perspective which should be taken. Indeed some research philosophies prefer the quality of data taken against the quantity. This implies that the research can either observe smaller range of data into the deep or simplify wider range of data and get to the root of the issue (Holden, M. T., & Lynch, P., 2004). Finally as Holden & Lynch (2004) say, the research philosophy leads to many other options and creates good start for the research methodology taken:

> *A review of philosophy is a vital aspect of the research process as it opens researchers' minds to other possibilities, which can lead to both an enrichment of their research skills and an enhancement in their confidence that they are using the appropriate methodology. (Holden, M. T., & Lynch, P., 2004, p.407)*

3.1.2 Realism as main research philosophy

This work is taken in the realistic approach. Realism combines both positivism and interpretivism. Firstly the research philosophy called positivism is, in the case of the research strategy, a lot about the data used and the objective point of view (Blumberg et al., 2014). This theory believes that only valuable data or knowledge are those which we can confirm by our senses. Positivism also strongly distinguish this valuable data from normative data which stems for instance from behaviour. Moreover behind each knowledge should be large scale of data collected (Bryman, A. & Bell, E., 2011). No wonder that this approach is mainly used in natural sciences, where examined events are independent towards the observer (Cameron, S. & Price, D., 2009).

In this research the financial data are observed. In the world of finance and investment we can not only believe in what we think and trust but have to know the statistical proven facts and numbers based on market movements and price creation by supply and demand. By a research in positivism the researcher is always independent and do not intervene in

what is observed. In the same way one person cannot affect the prices of wine or the inflation (Holden, M. T., & Lynch, P., 2004).

On the other hand the positivism if used as only one approach can have some restrictions. Still this work is closely related to economy which is particularly also the social science and numbers as inflation and prices of goods are affected by a mass of people. So even when one man personally cannot affect what is observed, it does not mean the data used exist in vacuum. Realism connects the positivism with interpretivism which is in fact opposite philosophy consisting of opinion that the society does not stand on physical laws and by observing humans there is need to observe them from human point of view with all feelings and by using verbal evaluation (Blumberg et al., 2014).

Realism simply believes that positivism and interpretivism can be used together and complement each other, so it is expected in this research that by using realistic approach the researcher avoids also limitations of both positivism and interpretivism (Blumberg et al., 2014).

3.1.3 Deductive approach

Attitude held in this paper is strongly deductive. There is need to distinguish between inductive and deductive approach. While inductive approach means to build new theory on the basis from findings, the deductive approach finds the results in theory and does not create new one. This approach is specific for the theory of positivism and also for quantitative research strategy where numbers play much bigger role than words (Bryman, A. & Bell, E., 2011).However the deductive theory is not only about creating new theory, but can also serve to test existing theory or a hypothesis (Cameron, S. & Price, D., 2009).

3.2 Research strategy

Research strategy is focused on how the data observed are obtained. In addition next paragraphs explain why the combination of two strategies is chosen and how they correlate with basic research hypothesis.

3.2.1 Secondary data analysis as main research strategy

Obtaining the data can be very time or money consuming process. Investment in wine is a complex issue with many players. There are auction houses, wine exchanges, sole traders, mutual funds and also large scale of investors. It is not possible to cover the data from all of these subjects and to watch every transaction with investment grade wine to get the primary data which is in my case the prices of wine. Obtaining the secondary data is much easier because some organization, government or research agency has gathered them before for its own purposes or to provide statistics, these institutions have better access to core data. Moreover the researcher do not need to go through order-less data and the data are available immediately. By obtaining the data from reliable source the researcher can have the certainty that the data were collected by specialists and are in good quality (Cameron, S. & Price, D., 2009; Blumberg et al., 2014).

Limitations of this approach are that the researcher actually is not present by collecting of data so he cannot authenticate its quality and as some institutions collect the data for they own purposes at the end of the day the data obtained could not be in relation with the issue investigated. Also the data could be complex and chaotic itself so it is hard for the researcher to orientate in this amount of the data (Blumberg et al., 2014).

3.2.2 Interview as supporting evidence

To avoid some limitations of secondary data analysis, especially to get closer to real environment of investment in wine and support the secondary data analysis, there will be also one method from qualitative analysis used - the interview (Cooper, D. R., & Schindler, P. S., 2011).

Interview is a type of primary data research because the data are obtained directly from the source. In this case the first interviewee is the associate director of Vin-x, Mr. Richard Boyle. Vin-x is a company which buys and sells investment grade wines for both institutional and sole clients. The second interviewee is a sales and marketing director and co-founder of Liv-ex Mr. Justin Gibbs, Liv-ex is the biggest wine exchange. This

type of research is dialogue managed by the interviewer who usually ask the questions related to the issue observed (Blumberg et al., 2014).

Due to avoid travel costs the email interview is used. In first stage of interview the core questions based on the literature review chapter are asked and if necessary then some additional questions regarding to what was answered at the first stage of conversation are asked. This type of interview also gives the respondent enough space and time to think about the answers in advance and find reliable information, even the understanding is better because the author is not native speaker. The disadvantage of this approach is a lack of straight communication to live human, the respondent knows the interviewer only on on-line basis (Cameron, S., & Price, D., 2009), however this "anonymity" can be also the advantage as the interviewee is not under pressure and is not afraid of the interviewer's reactions so it allows him to be more open (Quinlan, C., 2011).

3.2.3 Research hypothesis

Based on the facts provided in the chapter 1. Literature review this project tests the hypothesis of investment in wine as a hedge investment which is tough towards inflation and weakly correlated with the market and asset prices as well. Hypothesis testing design of research is often used by observation the relationship among data sets (Sekaran, U. & Bougie, R., 2010) and next qualitative research by interview to support previous calculations. Moreover a significant part of this research is also the risk and return evaluation.

3.3 Research methods

Research methods sub-chapter continues with explaining mixed-methods strategy and also provides the view over longitudinal design of research important for this project.

3.3.1 Mixed-methods research

In this work is used both quantitative method of analysis and qualitative method of analysis. According to the research hypothesis there is need to put data in correlation which is a statistical method of work with the data (Sekaran, U. & Bougie, R., 2010). Statistical methods use numerical expression of the situation and are widely used in quantitative research, while "verbal analysis" is typical feature for qualitative research (Collis, J., & Hussey, R., 2009). Also Cooper & Schindler (2011) state that quantitative research is all right by testing the hypothesis. Moreover Blumberg et.al (2014) says that this approach is often held in economics than by the other fields of study, as for instance literature or philosophy studies. However this research is so called "mixed-methods" research (Saunders et al., 2012), because besides the secondary data analysis the interview is used. The interview is strictly qualitative approach based on verbal statement and in depth view (Cooper, D. R., & Schindler, P. S., 2011).

3.3.2 Longitudinal research design

This study works with three categories of data collected. First set of data covers time period from the year 2004 to 2006. Second set of data covers the period among years 2007 to 2009. And third set covers only the period of years 2010 and 2015. In all cases quite long period will be watched and also changes of data in time. This approach is called the longitudinal analysis and it is one of the gains of the secondary data analysis (Bryman, A. & Bell, E., 2010) and also the typical feature of positivism and consists of the observation of the phenomenon or changes in data over the period of time as well (Collis, J., & Hussey, R., 2009).

3.4 Secondary data collection

Numerical data representing fine wine sector and used by this research are from on-line database of London International Vintners Exchange (Liv-ex) which is the organization

providing trade with fine wine, collecting historical and present data and helps the traders with logistic and provides wine cellars (Liv-ex, 2015). Also this research works the inflation rate and FTSE indexes which main features and compositions are provided in next couple of paragraphs.

3.4.1 Liv-ex and validity of the data

Liv-ex actually work as normal exchange, each day except weekends. Despite Liv-ex is UK organization and price of wine are in GBP, 80% of worldwide wine return is made by Liv-ex users which are investors from whole world. That is also why this exchange is chosen as a source of the secondary data, because of its majority on fine wine market (Erdos, P., & Ormos, M., 2013).

3.4.2 The composition of the data

The data used are essentially the averages of prices of wine purchased via Liv-ex. To calculate these averages Liv-ex use the "Mid-Price" pattern which looks for the middle of lowest purchase price the buyer is able to give for wine and the highest offer price (Liv-ex, 2015).

The prices are calculated according the index either monthly or daily and are valid for one case of wine which by Liv-ex is 9 litres (Erdos, P., & Ormos, M., 2013).

For the objectives of this paper are chosen five sets of data calculated monthly by Liv-ex, which are:

- Liv-ex fine wine 100 – selection of 100 most searched wines by the investors
- Champagne 50
- Liv-ex Bordeaux 500 – selection of 500 leading Bordeaux wines
- Liv-ex Investables – selection of Bordeaux red wines from 24 leading producers

- Liv-ex fine wine 1000 – selection of 1000 wines from the world including Champagne 50, Liv-ex Bordeaux 500, Bordeaux legends 50, Burgundy 150, Rhone 100, Italy 100 and Rest of the World 50 indices

Champagne 50 and Liv-ex Bordeaux 500 belongs under Liv-ex fine wine 1000 so there is estimated similarity in data (Liv-ex, 2015).

Because this research is longitudinal, each set of index represents some period of time. The longest period has Liv-ex Investables which starts in the year 2004 while shortest period has Liv-ex fine wine 100 which starts in the year 2010. By Liv-ex Investables and Champagne 50 we can observe also the pre-crisis and 2007-2009 financial crisis period of time because they both starts in the year 2004. Unfortunately by the rest is only the post-crisis period observed. Last month counted in this research is January 2015.

3.4.3 Inflation rate

In this project Liv-ex data are put in correlation with inflation rate. Firstly the inflation is "when the prices of most goods and services are rising over time" (Abel et al., 2008, p.6). The opposite phenomenon is deflation when the prices of goods and services decrease in time (Abel et al., 2008). By calculating this relationship is investigated if wine acts in the same way as economic growth. The research works with monthly calculated inflation rate of United Kingdom retrieved from the website RateInflation.com. Moreover is observed how recession-proof the investment in wine is in accordance to the hypothesis by Basseto et al. (2013) that in the recession usually the inflation decreases. It is important to mention that there are much more theories regarding to the link between inflation and economic growth and this issue is widely discussed and found controversial (Jayathileke, P. M. B., & Rathnayake, R. M. K. T., 2013). This project is based on Phillips curve theory which assumes that "inflation tends to be low when unemployment is high and high when unemployment is low" (Abel, et al., 2008, p.444) and agree with the statement that "high inflation positively affects the economic growth by creating of a low unemployment rate" (Jayathileke, P. M. B., & Rathnayake, R. M. K. T., 2013, p.87).

3.4.4 FTSE index

To find out if the investment in wine creates the hedge investment there is need to put the wine returns in correlation with the other assets. In this case in correlation with stock market. For this calculation are used FTSE 100 and FTSE-all share indexes because they provide good reflection of the UK's market. Firstly FTSE 100 is "based on the 100 largest companies which make up approximately 80per cent of the total market capitalisation of the LSE" (Arnold, G., 2010, p.468-469). While FTSE All-share "is the most representative in that it reflects the average movements of about 600 shares representing 98% of the value of the London market" (Arnold, G., 2010, p. 469).

3.5 Evaluation of the investment

When an investor evaluates potential investment, he is always considering risk and return of the investment. To calculate these figures there is capital gains yield and standard deviation used. Likewise because of measurement of relationship among wine, inflation and FTSE, also the coefficient of correlation is introduced.

3.5.1 Rate of return

To evaluate returns flowing from investment it is used the capital gains yield known as an instrument for calculating return from changes of price. This equation is used to calculate monthly return:

Equation 1: Capital gains yield

$$Capital\ gains\ yield = \frac{(P_{t+1} - P_t)}{P_t}$$

(Corrado, C. J., & Jordan, B. D., 2005, p.4)

P_{t+1} is a price of wine in month which is observed and P_t is price of wine in month before. For further evaluation of the return overall is the average and sum in excel function used. Also for better observation of stock exchange, the return will be by FTSE indexes calculated as well with purpose of find the changes in stock prices.

3.5.2 Standard deviation

To calculate risk of investment in wine quite simple method of standard deviation chosen. Standard deviations how stable is the price of an asset in time period (Arnold, G., 2010). Standard deviation is calculated in percent. If the result is low the investment is stable in the time and the investor do not need to be concerned about the return. On the other hand if the percentage is high it means that the price of the investment fluctuates a lot and it is much more risky, the investor could either lost his money or have high return (Rutterford, J., & Davison, M., 2007).

"Standard deviation S is the square root of V" (Rutterford, J. & Davison, M., 2007, p. 57) which is the variation. As in this project is not any desired expected return, the standard deviation from the sample of raw data is calculated by using this equation:

Equation 2: Standard deviation

$$S = \sqrt{\frac{\Sigma\,(x - \bar{x})^2}{n}}$$

(Curwin, J., & Slater, R., 2008, p.141)

In this case **x** is one Liv-ex index per month, $\bar{\mathbf{x}}$ is the average of all indexes in period of time and **n** is quantity of months. As in this work is not any desired return, standard deviation is calculated as fluctuation of wine prices around the average price.

3.5.3 Correlation coefficient

As an instrument of observing the relationship among prices of wine, inflation and FTSE index the calculation of the coefficient of correlation is implemented, coefficient of correlation measures how much are two variables related to each other (Waters, C.D.J, 2008).

In accordance with Morris (2008) the coefficient of correlation (**r**) can be calculated by using following equation:

Equation 3: Coefficient of correlation

$$r = \frac{covariance\ (x,y)}{s_x s_y} = \frac{\Sigma(x-\bar{x})(y-\bar{y})/n}{s_x s_y}$$

(Morris, C., 2008, p.295)

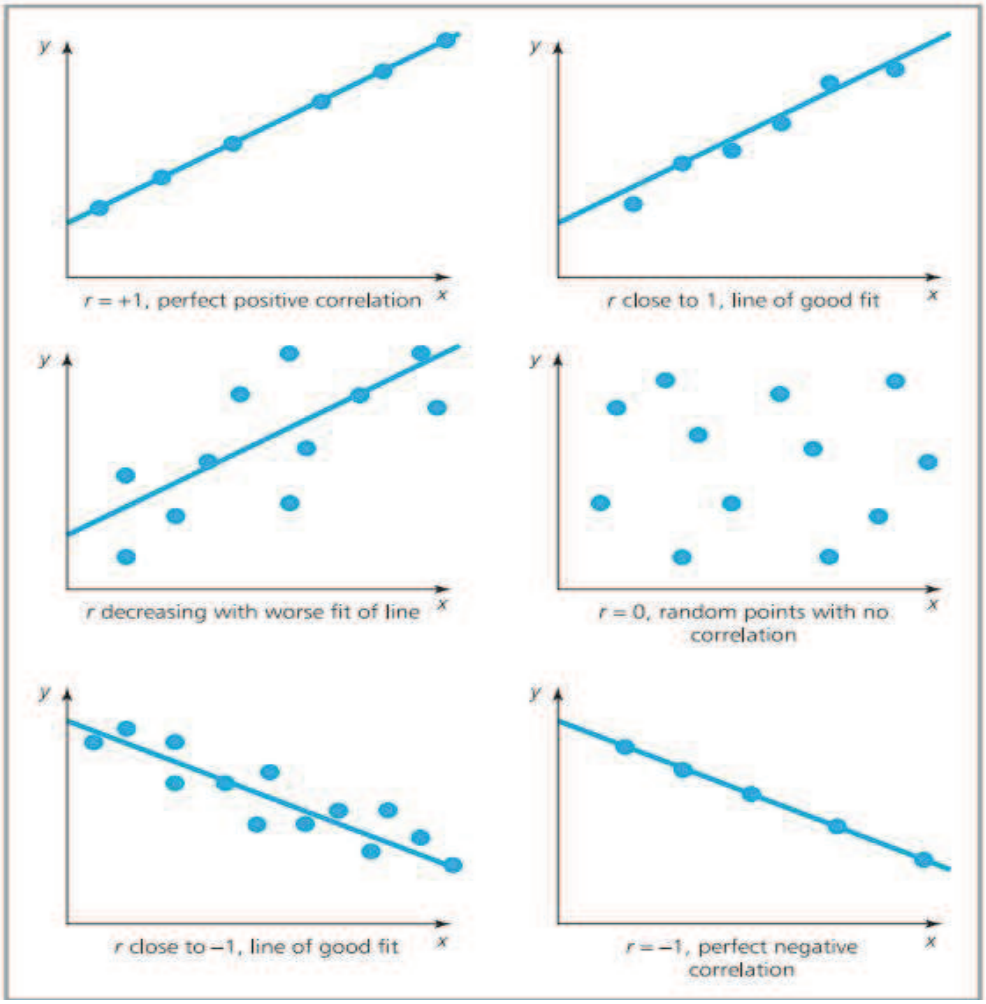
If fitted to this work **x** is the first variable, monthly return of wine in case of calculating with inflation or wine price in case of calculating with FTSE index, **y** is the second variable which could be either inflation rate or FTSE index according to which correlation is calculated, **n** is understood as number of variables, in our case the number of month. $\mathbf{S_x}$ and $\mathbf{S_y}$ refer to standard deviations of both variables and $\bar{\mathbf{x}}$ with $\bar{\mathbf{y}}$ are means as explained by the calculation of standard deviation. In this project statistical data analysis function in Excel is used to calculate the coefficient of correlation in shorter time.

To find out if there is a relationship among data in advance it can be useful to put them in the scatter graph and watch for common direction, Morris (2008) says it is a good start for the evaluation. The interpretation of data is also explained in Waters' (2008) work and both authors agree with statement that the closer is the result to number 1 the tighter the relationship is, if the result is closer to zero, there is almost no relationship and when the

result is negative there exist the negative correlation which means that while one variable increases the other decreases and vice versa.

Arnold. G. (2010, p.477) states that "diversification of portfolio goes with negative correlation among assets". With this instrument then can be examined if wine is suitable assets for diversification of portfolio.

Figure 1: Interpreting the coefficient of correlation



(Waters, C.D.J., 2008, p. 215)

3.6 Limitations and ethical issues

This research is mainly the secondary data analysis, all data in this work come from publicly available sources. Second method of the research is the interview by which the

respondents answers the questions voluntarily and can leave the research whenever they want. The respondents can also take his time by answering the questions and is not under pressure during the research.

This project is limited by lack of time to study the issue completely and also by lack of experience of its author. Interview is held only with two persons showing only two points of view, although the interviewees are specialist in this field which is quite new and unexplored. Also there are controversies around links between inflation and economic growth when different economists have different point of view to this issue. By considering the secondary data evaluation there is lack of data showing prices of one single type of wine, instead of it there is need to calculate with wine indexes which show the selection of most popular and traded fine wines, final results then can be distorted. Moreover the research is focused on the United Kingdom's environment because author studies in the UK during this research and wants to stay focused on this economy. Nevertheless most of wines observed are French. The author is convinced that these limitations do not affect the variability and reliability of data observed and likewise the hypothesis testing.

4. FINDINGS AND RESULTS

The aim of this work is to evaluate risk and returns of investment in fine wine and test the hypothesis of wine as alternative investment. This chapter presents the results of first stage of secondary data analysis which are analysis of risk and analysis of return, both is important for investor's decision if to invest in this kind of assets. Second stage of secondary data analysis is the coefficient of correlation calculations which test the hypothesis of wine as alternative asset itself and also gives the investor information if the wine investments are proper for diversification of the portfolio. Then is primary research presented by which data is obtained by interview to support previous data analysis. In the last part of this chapter results of all calculations together with findings from both interviews are discussed.

4.1 Risk and return analysis

The risk and return analysis is crucial for investor's decision. Before presenting the results itself, the graphical development of fine wine prices is stated. Then first part of risk and return analysis shows the findings and results of capital gains yield calculations (see equation 1). In the second part of this sub-chapter, results of standard deviation (equation 2) are published with the charts from the first part taken into account.

4.1.1 Price development of fine wine

For better illustration of results, following figures show development of value for all measured wine indexes.

Figure 2: Liv-ex fine wine 100 price development

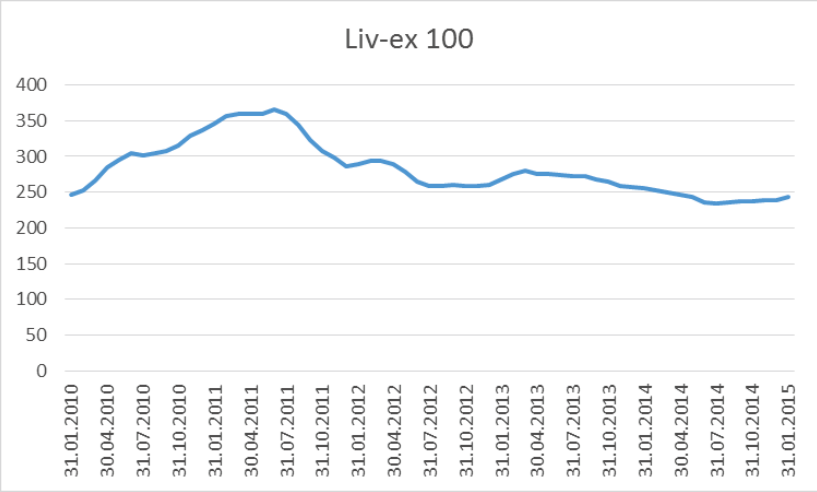


Figure 3: Liv-ex Investables price development

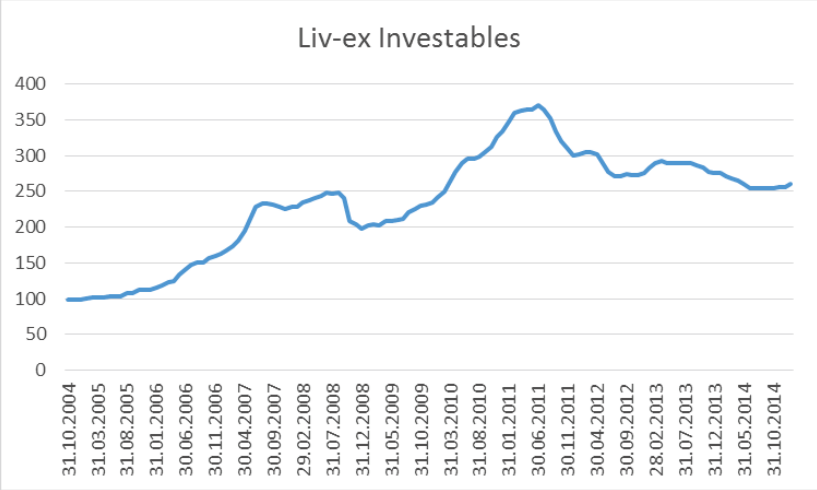


Figure 4: Liv-ex fine wine 1000 price development

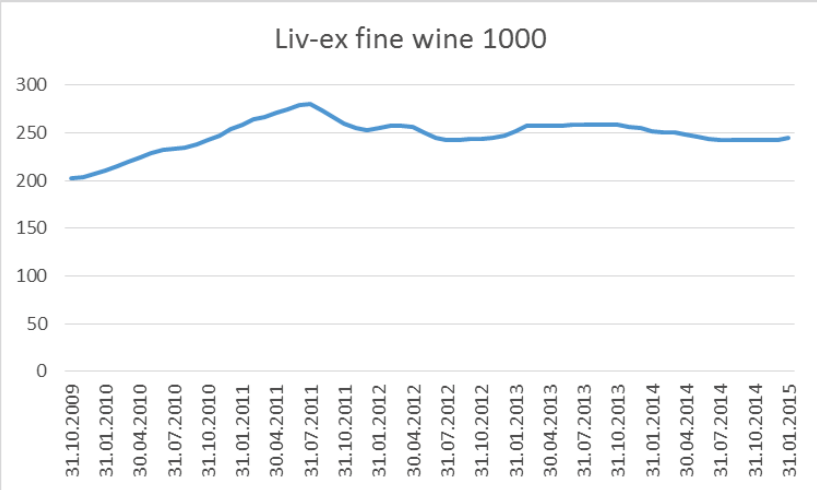


Figure 5: Liv-ex Bordeaux 500 price development

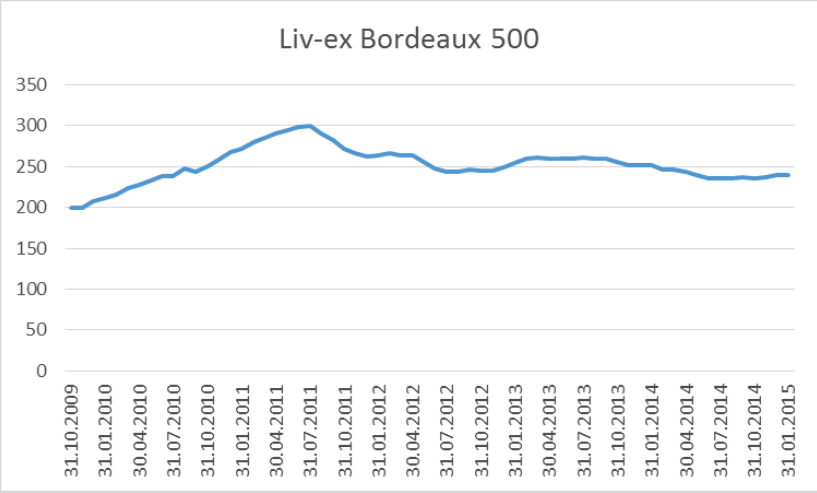
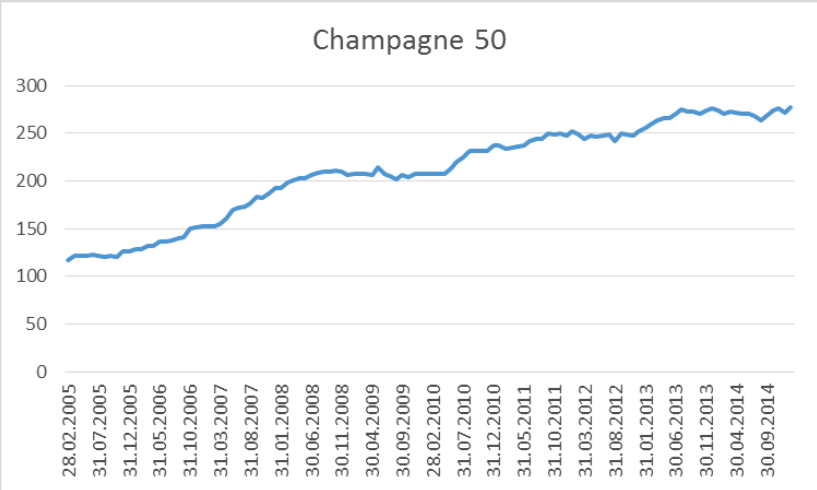


Figure 6: Champagne 50 price development



4.1.2 Rate of return of wine investments

The current inflation is on 0%. So in accordance to the average return of investment grade wines and champagne the money invested in this kind of asset are not losing its value in time. However in January the inflation was on 0.3% and the inflation target in the United Kingdom is on 2% (Bank of England, 2015; Trading economics, 2015). As recognizable from table 1, wine returns do not exhibit an outstanding performance among months but there is stable increase in observed period namely by Liv-ex Investables more than 100% and also by Champagne 50 is sustainable development observed.

Table 1: Analysis of return

Index	Period observed	Average return	Total return
Liv-ex fine wine 100	31/01/2010-31/01/2015	0.01%	0.65%
Champagne 50	28/02/2005-31/01/2015	0.74%	88.05%
Liv-ex Bordeaux 500	31/10/2009-31/01/2015	0.31%	19.35%
Liv-ex Investables	31/10/2004-31/01/2015	0.83%	102.7%
Liv-ex fine wine 1000	31/10/2009-31/01/2015	0.31%	19.84%

From figures (figure 2, figure 3, figure 4 and figure 5) it is distinct that wine prices reached its peak in summer 2011 after two years long period of growth, then the prices felt. Exception is by Champagne 50 (figure 6) which has sustainable growth during whole

period. Robert Parker explained this changes as low demand for Bordeaux during second half of year 2011 (Schmitt P., 2012). Bordeaux is important part of each index except Champagne 50, what is why Champagne 50 was not affected by change in demand for Bordeaux. Moreover in January 2012 was fine wine market affected by huge Euro depreciation so investors' wine lose its value due to weakening of currency (Collinson, P., 2013). Process of calculation of analysis of return is stated in appendix A.

4.1.3 Risk of wine investments

Calculations of standard deviation shows high volatility of prices namely by Champagne 50 and Liv-ex Investables, although these two indexes exhibits the highest returns. High volatilities in prices are recognizable from charts as well, namely by Liv-ex Investables (figure 2) it is distinct that price fluctuates in time. The most profitable wines are the riskiest ones.

Table 2: Analysis of risk

Index	Period observed	Standard deviation
Liv-ex fine wine 100	31/01/2010-31/01/2015	37.3%
Champagne 50	28/02/2005-31/01/2015	49.4%
Liv-ex Bordeaux 500	31/10/2005-31/01/2015	21.5%
Liv-ex Investables	31/10/2004-31/01/2015	73.2%
Liv-ex fine wine 1000	31/10/2009-31/01/2015	16.6%

Process of standard deviation measurement is stated in appendix B.

4.2 Correlation of returns

Correlation of returns among wine returns, inflation and development on London Stock Exchange shows how much is wine in relation with inflation and financial assets. In this sub-chapter are results of calculations of coefficient of correlation (equation 3) published. Main objective in this sub-chapter is to test the hypothesis of wine investment as hedge investment and also to observe wine performance during market fluctuations and

financial crisis (2007-2009) especially. Procedure of coefficient of correlation calculations is stated in appendix C.

4.2.1 Pre-crisis period

Champagne 50 shows negative correlation with stock market and inflation, what means that during recession the prices of Champagne should increase and vice versa. Liv-ex Investables show low correlation with stock market and small relation with inflation. In accordance to results it is confirmed that before financial crisis investment grade wines and champagne created the alternative investment and in case of champagne the hedge against inflation as against the first considered risk by investment.

Table 3: Correlation of returns in pre-crisis period

Index	Period observed	FTSE-all share	FTSE-100	Inflation
Champagne 50	28/02/2005-31/12/2006	-0.132	-0.138	-0.067
Liv-ex Investables	31/10/2004-31/12/2006	0.039	0.04	0.337

4.2.2 Financial crisis period

During financial crisis, Champagne 50 and Liv-ex Investables got closer to stock market and confirm Masset & Weisskopf (2010) findings that during financial crisis the correlations increased considerably. However by Champagne 50, despite of increase in correlation, the relationship with stock market still remains low. Relation among Champagne 50 and inflation changes negligibly whereas Liv-ex Investable shows opposite values in comparison with previous time period.

Table 4: Correlation of returns during financial crisis

Index	Period observed	FTSE-all share	FTSE-100	Inflation
Champagne 50	31/01/2007-31/12/2009	0.031	0.065	-0.069
Liv-ex Investables	31/01/2007-31/12/2009	0.411	0.386	-0.388

4.2.3 Post-crisis period

From the end of financial crisis till nowadays all indexes show low or negative correlation with stock market and inflation. Moreover all indexes confirm their status of alternative investments. Also the correlation with inflation remains insignificant.

Table 5: Correlation of returns in post-crisis period

Index	Period observed	FTSE-all share	FTSE-100	Inflation
Liv-ex fine wine 100	31/01/2010-31/01/2015	-0.082	0.113	-0.052
Champagne 50	31/01/2010-31/01/2015	0.145	-0.075	0.082
Liv-ex Bordeaux 500	30/11/2009-31/01/2015	0.03	0.062	0.08
Liv-ex Investables	31/01/2010-31/01/2015	-0.044	0.099	0.002
Liv-ex fine wine 1000	30/11/2009-31/01/2015	0.009	0.15	0.10

4.3. Interviews

Two interviews with specialists in field of investment in fine wine held during March 2015 are essential part of primary research, first interview is with Mr. Richard Boyle, associate director of Vin-x. Second interview is with Mr. Justin Gibbs, sales and marketing director and co-founder of Liv-ex. Full version of questions asked is available in appendix D.

4.3.1 Interview No.1 – Mr. Richard Boyle

What risks are connected with the investment in fine wine and which one you consider the most serious? And why?

Investment decisions are influenced by the opinions of powerful critics like Robert Parker who can just as easily change his mind a few years later (recent example 2003 Mouton which he downgraded from 95 to 91 points and has lost ground in comparison to other First Growths from the same vintage). Auction house costs can be expensive. The spreads between bids and offers on Liv-ex and with merchants can be large. Buying en primeur ties up your cash for 2 years before the wine becomes physical. Storage and insurance costs erodes margins. The market is not as liquid as traditional financial markets. Bad weather can lead to poor harvests which reduces demand for those vintages. Poor provenance and counterfeit wine are an issue. Knowing when to enter and exit the market. The most serious risk in my view in the last few years has been the non-purchase or delivery of wine by bogus fine wine companies which has seriously damaged the reputation of the market.

What role do currency movements play in the fine wine industry and how does it affects fine wine prices?

The vast majority of fine wine is to be found in the Eurozone (France, Italy, Spain) with the US and Australia being the only other significant players so really it all depends on how strong/weak the euro is against other major outside currencies. In reality this usually means the dollar because the US was probably the biggest buyer of fine wine outside the Eurozone with the UK close behind. But the emergence of Chinese interest in fine wine in the last decade has altered the balance somewhat. Therefore because fine wine is principally priced in euros the strength of Europe's economy will always dictate prices. Currently the dollar is very strong and the euro relatively weak so there are good indications that the US will be looking to buy more fine wine this year than previously. Currency movements therefore can make fine wine more attractive but only to those markets outside the Eurozone, so the US, UK and China which are the biggest export

markets outside Europe. I would normally include Russia but the rouble has been battered by the drop in the oil price and I have no intelligence as to how their fine wine market is faring.

Tell me about the cause of volatility of fine wine prices and how the investor can deal with it?

You need to be aware that the fine wine investment market is essentially very simple and simply depends on the balance between supply and demand. Furthermore it has to be regarded as a luxury good as well as an alternative investment. Consequently it is a less volatile market because the volume of fine wine traded on a daily, weekly, monthly or annual basis is much smaller than the stock markets of the world where millions of shares are traded hourly. Even the largest chateau in Bordeaux produces no more than about 25,000 cases per year. And then you have to set that against the million millionaires in China alone. As I said before it is a luxury good and so the wealthiest citizens of the world want to drink the best wine available regardless of the price. Fortunately for us the chateaux cannot produce any more wine each year due to land constraints (unless they buy a neighbouring vineyard) so in a great vintage like 2009 demand exceeds supply. However the fine wine world has expanded and if prices get too high then investors will seek out better value elsewhere. Recently we have advised our clients to diversify their portfolios in to other regions of France like Champagne, Burgundy and the Rhone or even go further afield in to Spain, Italy, US and Australia. Volatility can also be caused by poor vintages like we have seen in the past 3 years leading to lack of confidence in Bordeaux. Global recession is usually the only reason for economic volatility but it can be caused by changes in a tax regime as happened in Hong Kong in 2008 and may happen again in India when the EU finally sign a trade treaty with their government to lower taxes on wine. Other reasons for volatility can be confined to domestic policy. For instance the Chinese clamped down on government entertainment which impacted on demand for fine wine. Apart from diversification the other ways to combat volatility can be by “doubling down” (buying another case of wine as the price falls) or investing in more than one case of the same wine at the same time which allows the investor to realise price gains whilst at the same time maintaining an interest in the market.

Which instruments are used to predict fine wine prices?

The main instrument we use would be Liv-ex which has been in existence since 1999 and has comprehensive data going back much further. Whilst it obviously can't predict exactly the price of fine wine in the future it is usually fairly good at examining trends in the market and it publishes very useful graphs and other data which can help us to predict in which direction the market is moving. We also look at wine-searcher.com which gives an indication of spreads in the market place and can indicate how bullish merchants are feeling. We don't tend to use the other exchanges like Cav-ex or Wine Owners because they are more geared toward the retail market.

Tell me about the performance of fine wine during the financial crisis in years 2007-2008 and what were the key circumstances affecting the prices of fine wine during this period?

The main influence during this period was the rise in Chinese demand in 2007 followed by the removal of all taxes on wine in Hong Kong in 2008 so effectively the market powered ahead during most of this time till the collapse of Lehman Brothers in September 2008 at which time it fell off a cliff. So it was relatively unaffected by the credit crunch which manifested itself in 2007 but the collapse of Lehman's triggered such a global financial crisis that also affected the fine wine market. Despite this the market still increased in value by about 50% between January 2007 and December 2008.

4.3.2 Interview No.2 – Mr. Justin Gibbs

What risks are connected with the investment in fine wine and which one you consider the most serious? And why?

Fine wine risks are no greater than anywhere else (other investments) – getting the timing right is always the most important. What is specific to wine market - is it is smaller than other more mainstream markets so you can get exaggerated shifts when people start

perusing the same thing, so if you come into this late, you might find yourself buying at the top of the market. So getting timing wrong is your greatest risk.

Tell me about the cause of volatility of fine wine prices and how the investor can deal with it?

Volatility isn't something that fine wine is famed for. It is a little more 'pedestrian'. There have been moments when volatility has been the case. Laffite Rothschild, for example, rose and fell the most as the market moved up from 2009 and back down from July 2011. We also see occasionally see sharp upgrades in the prices of individual wines following an upgrade from leading Bordeaux critic, Robert Parker. (For example, Haut Bailly 2009 was upgraded to 100 points – a 'perfect wine' by Parker in Nov 2014. On 7/11/14 it traded for £775 per 12x75; three days later it traded for £1,125).

Which fine wine is the most stable one and why?

There is no one single stable fine wine. As a single area, because it is the greatest and the price transparency is the greatest, Bordeaux Left Bank is the most stable. It is the most mature, established market. Price discovery is more efficient – this takes away volatility.

Tell me about the performance of fine wine during the financial crisis in years 2007-2008 and what were the key circumstances affecting the prices of fine wine during this period?

There was a 'dash for cash' when there was no real safe investment. So from the end of August to the end of October, the Liv-ex Fine Wine 100 Index dropped 22%. It then began to stabilise and recover.

4.4. Discussion

Risk and return evaluation shows that both the riskiest and most profitable wines are behind Champagne 50 and Liv-ex Investables indexes. Better performance is observed by Champagne 50 which creates even good instrument for diversification of investor's portfolio as, together with Burgundy and Rhone, suggested in Interview No.1.

This suggestion could flow from the fact that majority of fine wine market is created by Bordeaux which is significant part of all indexes except Champagne 50. As seen in most of figures when demand for Bordeaux declined, whole index decreased. This happened last 3 years due to poor vintage of Bordeaux (Interview No.1) and also it is seen in figures (figure 2, figure 3, figure 4 and figure 5) as decline in price after summer 2011.

As observed in secondary data analysis, Champagne 50 also performed well during financial crisis. Nevertheless by other wine indexes only post-crisis performance was measured so their performance during financial crisis is unknown. The other indexes are more stable however do not show that significant growth as was measured by Liv-ex Investables and Champagne 50.

In addition Liv-ex fine wine 100 and Liv-ex Investables in their post-crisis period creates instruments for diversification of portfolio as well. However Liv-ex fine wine 100 index does not have such good percentage of returns.

Rumsey D.J. (2011) states that till result of 0.5 and more is the correlation coefficient showing "weak linear relationship". The closest to this result is Liv-ex Investables index with result 0.411 during financial crisis, what is not surprising because it is known that during financial crisis was the correlation among wine and other assets stronger. Despite of it, the research confirms the statement of wine as alternative investment, because correlation of wine and stock market remains weak or negative. Moreover Interview No.1 states that wine is alternative investment and confirms the hypothesis of this research. By considering weak or negative correlation with inflation during whole period measured (2004-2015) this research also confirms the theory of wine investments as recession proof ones.

Both interviews confirm the risks stated in chapter 1. Literature review as risks of fraud, costs of storage, illiquidity and risk of market itself. By considering currency risk,

nowadays, due to strong USD, is investment in fine wine preferable by American investors.

Fine wine did not go through financial crisis as bad as other assets, some decline in price was observed, because of lack of cash mentioned in Interview No.2, but Chinese demand for this kind of luxuries was benefit during these times. Also in Interview No.2 is observed recovery of fine wine prices right after end of the financial crisis as well as this research.

By considering the volatility of fine wine prices, Interview No.1 states that it is better when wine prices are changing its value in single days or weeks because, when compared to stock market, a share could change its value in an hour. Overall this idea sees the fine wine investments as far more stable than some financial assets.

5. CONCLUSION

This research aimed to test the hypothesis of fine wine as alternative asset class and to evaluate the risks and returns of fine wine investments as two important factors for investor's decision. Firstly the capital gain yield was established for calculations of wine returns during periods from year 2004 till 2015. For evaluation of risks the standard deviation was used for the same period. However the periods varied from types of wine indexes. Finally was the coefficient of correlation was introduced with which the hypothesis of wine as alternative investment was tested.

The results were not surprising because they confirmed the ideas stated in the chapter 1. Literature review, that fine wine is alternative investment. However for diversification of portfolio are in the long term view appropriate only some kinds of wine, namely Champagne which also through its high volatility in prices has stable growth in time and high returns. Champagne was also suggested by Mr. Boyle in one of two interviews which were held to support previous calculations. Also the Liv-ex Investables, an index of red Bordeaux from leading chateaux showed high returns however the same issue as by Liv-ex Investables was the volatility of prices.

Recommendations

At the end of the day it is a pity that more wines from smaller provinces and the rest of the world were not observed in secondary data analysis, because most probably Burgundy and Rhone could perform as good as Champagne - these wines are also suggested by Interview No.1 as good instruments for diversification of investors portfolio. However it seems like the entire fine wine market is led by popular Bordeaux, despite of it the wines from another parts of France and rest of the world can create better investment opportunity nowadays. However this could be the aim of further research.

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LIST OF ABBREVIATIONS

Cav-ex – wine trading and portfolio platform

EU European Union

FTSE Financial Times Stock Exchange – stock exchange indices

GBP Great British Pounds

GE General Electrics

Liv-ex London International Vintners Exchange – fine wine exchange

LSE London Stock Exchange

OTC Over the counter – decentralized market

r – Coefficient of correlation

S – Standard deviation

UK United Kingdom

US United States

USD United States dollar

Vin-x – Fine wine investment company

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Barbara Wilczková

jméno a příjmení studenta

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Barbora Urbanová

Student´s name and surname

LIST OF ANNEXES

Appendix A: Calculations of returns

Date	Liv-ex fine wine 100	Return
31.01.2010	246	
28.02.2010	253	2.85%
31.03.2010	267	5.53%
30.04.2010	284	6.37%
31.05.2010	296	4.23%
30.06.2010	305	3.04%
31.07.2010	301	-1.31%
31.08.2010	304	1.00%
30.09.2010	308	1.32%
31.10.2010	316	2.60%
30.11.2010	329	4.11%
31.12.2010	336	2.13%
31.01.2011	346	2.98%
28.02.2011	357	3.18%
31.03.2011	359	0.56%
30.04.2011	359	0.00%
31.05.2011	359	0.00%
30.06.2011	365	1.67%
31.07.2011	359	-1.64%
31.08.2011	345	-3.90%
30.09.2011	323	-6.38%
31.10.2011	308	-4.64%
30.11.2011	298	-3.25%
31.12.2011	286	-4.03%
31.01.2012	290	1.40%
29.02.2012	294	1.38%
31.03.2012	294	0.00%
30.04.2012	290	-1.36%
31.05.2012	278	-4.14%
30.06.2012	265	-4.68%
31.07.2012	258	-2.64%
31.08.2012	259	0.39%
30.09.2012	260	0.39%
31.10.2012	258	-0.77%
30.11.2012	258	0.00%
31.12.2012	261	1.16%
31.01.2013	268	2.68%
28.02.2013	276	2.99%
31.03.2013	280	1.45%
30.04.2013	276	-1.43%
31.05.2013	275	-0.36%
30.06.2013	274	-0.36%
31.07.2013	273	-0.36%
31.08.2013	273	0.00%
30.09.2013	268	-1.83%
31.10.2013	265	-1.12%
30.11.2013	258	-2.64%
31.12.2013	257	-0.39%
31.01.2014	255	-0.78%
28.02.2014	253	-0.78%
31.03.2014	249	-1.58%
30.04.2014	247	-0.80%
31.05.2014	243	-1.62%
30.06.2014	236	-2.88%
31.07.2014	234	-0.85%
31.08.2014	236	0.85%
30.09.2014	237	0.42%
31.10.2014	238	0.42%
30.11.2014	239	0.42%
31.12.2014	239	0.00%
31.01.2015	243	1.67%
	SUM	**0.65%**
	Average	**0.01%**

Date	Liv-ex Bordeaux 500	Return
31.10.2009	199	
30.11.2009	200	0.50%
31.12.2009	207	3.50%
31.01.2010	212	2.42%
28.02.2010	216	1.89%
31.03.2010	224	3.70%
30.04.2010	228	1.79%
31.05.2010	233	2.19%
30.06.2010	238	2.15%
31.07.2010	238	0.00%
31.08.2010	247	3.78%
30.09.2010	244	-1.21%
31.10.2010	250	2.46%
30.11.2010	258	3.20%
31.12.2010	267	3.49%
31.01.2011	272	1.87%
28.02.2011	280	2.94%
31.03.2011	285	1.79%
30.04.2011	290	1.75%
31.05.2011	294	1.38%
30.06.2011	298	1.36%
31.07.2011	300	0.67%
31.08.2011	291	-3.00%
30.09.2011	282	-3.09%
31.10.2011	272	-3.55%
30.11.2011	266	-2.21%
31.12.2011	262	-1.50%
31.01.2012	264	0.76%
29.02.2012	266	0.76%
31.03.2012	264	-0.75%
30.04.2012	263	-0.38%
31.05.2012	256	-2.66%
30.06.2012	247	-3.52%
31.07.2012	243	-1.62%
31.08.2012	244	0.41%
30.09.2012	246	0.82%
31.10.2012	245	-0.41%
30.11.2012	245	0.00%
31.12.2012	249	1.63%
31.01.2013	254	2.01%
28.02.2013	260	2.36%
31.03.2013	261	0.38%
30.04.2013	260	-0.38%
31.05.2013	259	-0.38%
30.06.2013	260	0.39%
31.07.2013	261	0.38%
31.08.2013	260	-0.38%
30.09.2013	259	-0.38%
31.10.2013	256	-1.16%
30.11.2013	252	-1.56%
31.12.2013	251	-0.40%
31.01.2014	251	0.00%
28.02.2014	246	-1.99%
31.03.2014	246	0.00%
30.04.2014	243	-1.22%
31.05.2014	240	-1.23%
30.06.2014	235	-2.08%
31.07.2014	235	0.00%
31.08.2014	235	0.00%
30.09.2014	237	0.85%
31.10.2014	236	-0.42%
30.11.2014	237	0.42%
31.12.2014	239	0.84%
31.01.2015	239	0.00%
SUM		**19.35%**
Average		**0.31%**

Date	Liv-ex Investables	Return
31.10.2004	98	
30.11.2004	99	1.02%
31.12.2004	99	0.00%
31.01.2005	100	1.01%
28.02.2005	101	1.00%
31.03.2005	101	0.00%
30.04.2005	102	0.99%
31.05.2005	103	0.98%
30.06.2005	103	0.00%
31.07.2005	103	0.00%
31.08.2005	107	3.88%
30.09.2005	107	0.00%
31.10.2005	112	4.67%
30.11.2005	113	0.89%
31.12.2005	113	0.00%
31.01.2006	116	2.65%
28.02.2006	119	2.59%
31.03.2006	123	3.36%
30.04.2006	125	1.63%
31.05.2006	134	7.20%
30.06.2006	142	5.97%
31.07.2006	148	4.23%
31.08.2006	151	2.03%
30.09.2006	150	-0.66%
31.10.2006	156	4.00%
30.11.2006	159	1.92%
31.12.2006	163	2.52%
31.01.2007	167	2.45%
28.02.2007	173	3.59%
31.03.2007	181	4.62%
30.04.2007	194	7.18%
31.05.2007	212	9.28%
30.06.2007	228	7.55%
31.07.2007	233	2.19%
31.08.2007	233	0.00%
30.09.2007	231	-0.86%
31.10.2007	228	-1.30%
30.11.2007	226	-0.88%
31.12.2007	228	0.88%
31.01.2008	229	0.44%
29.02.2008	234	2.18%
31.03.2008	238	1.71%
30.04.2008	240	0.84%
31.05.2008	243	1.25%
30.06.2008	248	2.06%
31.07.2008	247	-0.40%
31.08.2008	248	0.40%
30.09.2008	240	-3.23%
31.10.2008	209	-12.92%
30.11.2008	204	-2.39%
31.12.2008	198	-2.94%
31.01.2009	202	2.02%
28.02.2009	204	0.99%
31.03.2009	202	-0.98%
30.04.2009	208	2.97%
31.05.2009	209	0.48%
30.06.2009	210	0.48%
31.07.2009	212	0.95%
31.08.2009	220	3.77%
30.09.2009	225	2.27%
31.10.2009	230	2.22%
30.11.2009	232	0.87%
31.12.2009	235	1.29%
31.01.2010	242	2.98%
28.02.2010	249	2.89%
31.03.2010	263	5.62%
30.04.2010	277	5.32%
31.05.2010	289	4.33%
30.06.2010	296	2.42%
31.07.2010	295	-0.34%
31.08.2010	298	1.02%
30.09.2010	304	2.01%
31.10.2010	313	2.96%
30.11.2010	326	4.15%
31.12.2010	334	2.45%
31.01.2011	347	3.89%
28.02.2011	360	3.75%
31.03.2011	363	0.83%
30.04.2011	364	0.28%
31.05.2011	365	0.27%
30.06.2011	370	1.37%
31.07.2011	365	-1.35%
31.08.2011	352	-3.56%
30.09.2011	334	-5.11%
31.10.2011	320	-4.19%
30.11.2011	310	-3.13%
31.12.2011	300	-3.23%
31.01.2012	302	0.67%
29.02.2012	305	0.99%
31.03.2012	305	0.00%
30.04.2012	302	-0.98%
31.05.2012	289	-4.30%
30.06.2012	277	-4.15%
31.07.2012	271	-2.17%
31.08.2012	271	0.00%
30.09.2012	274	1.11%
31.10.2012	273	-0.36%
30.11.2012	273	0.00%
31.12.2012	276	1.10%
31.01.2013	283	2.54%
28.02.2013	290	2.47%
31.03.2013	292	0.69%
30.04.2013	290	-0.68%
31.05.2013	290	0.00%
30.06.2013	290	0.00%
31.07.2013	289	-0.34%
31.08.2013	289	0.00%
30.09.2013	286	-1.04%
31.10.2013	283	-1.05%
30.11.2013	277	-2.12%
31.12.2013	276	-0.36%
31.01.2014	275	-0.36%
28.02.2014	271	-1.45%
31.03.2014	268	-1.11%
30.04.2014	265	-1.12%
31.05.2014	261	-1.51%
30.06.2014	255	-2.30%
31.07.2014	254	-0.39%
31.08.2014	255	0.39%
30.09.2014	255	0.00%
31.10.2014	255	0.00%
30.11.2014	256	0.39%
31.12.2014	256	0.00%
31.01.2015	260	1.56%
	SUM	**102.70%**
	Average	**0.83%**

Date	Champagne 500	Return
28.02.2005	117	
31.03.2005	121	3.42%
30.04.2005	121	0.00%
31.05.2005	121	0.00%
30.06.2005	123	1.65%
31.07.2005	121	-1.63%
31.08.2005	120	-0.83%
30.09.2005	121	0.83%
31.10.2005	120	-0.83%
30.11.2005	126	5.00%
31.12.2005	126	0.00%
31.01.2006	128	1.59%
28.02.2006	128	0.00%
31.03.2006	132	3.13%
30.04.2006	132	0.00%
31.05.2006	136	3.03%
30.06.2006	136	0.00%
31.07.2006	137	0.74%
31.08.2006	140	2.19%
30.09.2006	141	0.71%
31.10.2006	150	6.38%
30.11.2006	151	0.67%
31.12.2006	152	0.66%
31.01.2007	152	0.00%
28.02.2007	153	0.66%
31.03.2007	155	1.31%
30.04.2007	161	3.87%
31.05.2007	170	5.59%
30.06.2007	172	1.18%
31.07.2007	173	0.58%
31.08.2007	177	2.31%
30.09.2007	183	3.39%
31.10.2007	182	-0.55%
30.11.2007	187	2.75%
31.12.2007	193	3.21%
31.01.2008	192	-0.52%
29.02.2008	198	3.13%
31.03.2008	200	1.01%
30.04.2008	203	1.50%
31.05.2008	203	0.00%
30.06.2008	206	1.48%
31.07.2008	209	1.46%
31.08.2008	210	0.48%
30.09.2008	210	0.00%
31.10.2008	211	0.48%
30.11.2008	210	-0.47%
31.12.2008	206	-1.90%
31.01.2009	208	0.97%
28.02.2009	208	0.00%
31.03.2009	207	-0.48%
30.04.2009	206	-0.48%
31.05.2009	214	3.88%
30.06.2009	208	-2.80%
31.07.2009	205	-1.44%
31.08.2009	202	-1.46%
30.09.2009	206	1.98%
31.10.2009	204	-0.97%
30.11.2009	207	1.47%
31.12.2009	207	0.00%
31.01.2010	208	0.48%
28.02.2010	207	-0.48%
31.03.2010	208	0.48%
30.04.2010	208	0.00%
31.05.2010	213	2.40%
30.06.2010	220	3.29%
31.07.2010	225	2.27%
31.08.2010	232	3.11%
30.09.2010	232	0.00%
31.10.2010	232	0.00%
30.11.2010	231	-0.43%
31.12.2010	237	2.60%
31.01.2011	237	0.00%
28.02.2011	234	-1.27%
31.03.2011	235	0.43%
30.04.2011	236	0.43%
31.05.2011	237	0.42%
30.06.2011	242	2.11%
31.07.2011	244	0.83%
31.08.2011	244	0.00%
30.09.2011	250	2.46%
31.10.2011	249	-0.40%
30.11.2011	250	0.40%
31.12.2011	248	-0.80%
31.01.2012	252	1.61%
29.02.2012	249	-1.19%
31.03.2012	244	-2.01%
30.04.2012	248	1.64%
31.05.2012	246	-0.81%
30.06.2012	248	0.81%
31.07.2012	249	0.40%
31.08.2012	242	-2.81%
30.09.2012	250	3.31%
31.10.2012	249	-0.40%
30.11.2012	247	-0.80%
31.12.2012	252	2.02%
31.01.2013	255	1.19%
28.02.2013	260	1.96%
31.03.2013	264	1.54%
30.04.2013	266	0.76%
31.05.2013	266	0.00%
30.06.2013	271	1.88%
31.07.2013	275	1.48%
31.08.2013	273	-0.73%
30.09.2013	273	0.00%
31.10.2013	271	-0.73%
30.11.2013	274	1.11%
31.12.2013	276	0.73%
31.01.2014	274	-0.72%
28.02.2014	271	-1.09%
31.03.2014	273	0.74%
30.04.2014	272	-0.37%
31.05.2014	270	-0.74%
30.06.2014	270	0.00%
31.07.2014	268	-0.74%
31.08.2014	264	-1.49%
30.09.2014	268	1.52%
31.10.2014	274	2.24%
30.11.2014	276	0.73%
31.12.2014	272	-1.45%
31.01.2015	277	1.84%
	SUM	**88.05%**
	Average	**0.74%**

Date	Liv-ex fine wine 1000	Return
31.10.2009	202	
30.11.2009	204	0.99%
31.12.2009	207	1.47%
31.01.2010	211	1.93%
28.02.2010	215	1.90%
31.03.2010	220	2.33%
30.04.2010	224	1.82%
31.05.2010	229	2.23%
30.06.2010	232	1.31%
31.07.2010	233	0.43%
31.08.2010	235	0.86%
30.09.2010	238	1.28%
31.10.2010	242	1.68%
30.11.2010	247	2.07%
31.12.2010	254	2.83%
31.01.2011	258	1.57%
28.02.2011	264	2.33%
31.03.2011	267	1.14%
30.04.2011	271	1.50%
31.05.2011	275	1.48%
30.06.2011	279	1.45%
31.07.2011	280	0.36%
31.08.2011	273	-2.50%
30.09.2011	267	-2.20%
31.10.2011	260	-2.62%
30.11.2011	255	-1.92%
31.12.2011	253	-0.78%
31.01.2012	255	0.79%
29.02.2012	257	0.78%
31.03.2012	257	0.00%
30.04.2012	256	-0.39%
31.05.2012	251	-1.95%
30.06.2012	245	-2.39%
31.07.2012	243	-0.82%
31.08.2012	243	0.00%
30.09.2012	244	0.41%
31.10.2012	244	0.00%
30.11.2012	245	0.41%
31.12.2012	247	0.82%
31.01.2013	252	2.02%
28.02.2013	257	1.98%
31.03.2013	257	0.00%
30.04.2013	257	0.00%
31.05.2013	257	0.00%
30.06.2013	259	0.78%
31.07.2013	259	0.00%
31.08.2013	259	0.00%
30.09.2013	259	0.00%
31.10.2013	258	-0.39%
30.11.2013	256	-0.78%
31.12.2013	255	-0.39%
31.01.2014	252	-1.18%
28.02.2014	250	-0.79%
31.03.2014	250	0.00%
30.04.2014	248	-0.80%
31.05.2014	246	-0.81%
30.06.2014	244	-0.81%
31.07.2014	243	-0.41%
31.08.2014	243	0.00%
30.09.2014	243	0.00%
31.10.2014	243	0.00%
30.11.2014	243	0.00%
31.12.2014	243	0.00%
31.01.2015	245	0.82%
	SUM	**19.84%**
	Average	**0.31%**

Appendix B: Standard deviation calculations:

Date	Liv-ex fine wine 100 (x)	$(x- \bar{x})$	$(x- \bar{x})^2$
31.01.2010	246	-37	1369
28.02.2010	253	-30	900
31.03.2010	267	-16	256
30.04.2010	284	1	1
31.05.2010	296	13	169
30.06.2010	305	22	484
31.07.2010	301	18	324
31.08.2010	304	21	441
30.09.2010	308	25	625
31.10.2010	316	33	1089
30.11.2010	329	46	2116
31.12.2010	336	53	2809
31.01.2011	346	63	3969
28.02.2011	357	74	5476
31.03.2011	359	76	5776
30.04.2011	359	76	5776
31.05.2011	359	76	5776
30.06.2011	365	82	6724
31.07.2011	359	76	5776
31.08.2011	345	62	3844
30.09.2011	323	40	1600
31.10.2011	308	25	625
30.11.2011	298	15	225
31.12.2011	286	3	9
31.01.2012	290	7	49
29.02.2012	294	11	121
31.03.2012	294	11	121
30.04.2012	290	7	49
31.05.2012	278	-5	25
30.06.2012	265	-18	324
31.07.2012	258	-25	625
31.08.2012	259	-24	576
30.09.2012	260	-23	529
31.10.2012	258	-25	625
30.11.2012	258	-25	625
31.12.2012	261	-22	484
31.01.2013	268	-15	225
28.02.2013	276	-7	49
31.03.2013	280	-3	9
30.04.2013	276	-7	49
31.05.2013	275	-8	64
30.06.2013	274	-9	81
31.07.2013	273	-10	100
31.08.2013	273	-10	100
30.09.2013	268	-15	225
31.10.2013	265	-18	324
30.11.2013	258	-25	625
31.12.2013	257	-26	676
31.01.2014	255	-28	784
28.02.2014	253	-30	900
31.03.2014	249	-34	1156
30.04.2014	247	-36	1296
31.05.2014	243	-40	1600
30.06.2014	236	-47	2209
31.07.2014	234	-49	2401
31.08.2014	236	-47	2209
30.09.2014	237	-46	2116
31.10.2014	238	-45	2025
30.11.2014	239	-44	1936
31.12.2014	239	-44	1936
31.01.2015	243	-40	1600
Sum	17266		
Average	283.0491803		
Round ($\bar{x}$)	283		
Count (n)	61		
$\Sigma(x- \bar{x})^2$	85007		
$\Sigma(x- \bar{x})^2/n$	1393.557377		
variance	1393.557377		
standard deviation	37.33038142		

Date	Liv-ex Bordeaux 500 (x)	$(x- \bar{x})$	$(x- \bar{x})^2$
31.10.2009	199	-53	2809
30.11.2009	200	*-52*	*2704*
31.12.2009	207	-45	2025
31.01.2010	212	-40	1600
28.02.2010	216	-36	1296
31.03.2010	224	-28	784
30.04.2010	228	-24	576
31.05.2010	233	-19	361
30.06.2010	238	-14	196
31.07.2010	238	-14	196
31.08.2010	247	-5	25
30.09.2010	244	-8	64
31.10.2010	250	-2	4
30.11.2010	258	6	36
31.12.2010	267	15	225
31.01.2011	272	20	400
28.02.2011	280	28	784
31.03.2011	285	33	1089
30.04.2011	290	38	1444
31.05.2011	294	42	1764
30.06.2011	298	46	2116
31.07.2011	300	48	2304
31.08.2011	291	39	1521
30.09.2011	282	30	900
31.10.2011	272	20	400
30.11.2011	266	14	196
31.12.2011	262	10	100
31.01.2012	264	12	144
29.02.2012	266	14	196
31.03.2012	264	12	144
30.04.2012	263	11	121
31.05.2012	256	4	16
30.06.2012	247	-5	25
31.07.2012	243	-9	81
31.08.2012	244	-8	64
30.09.2012	246	-6	36
31.10.2012	245	-7	49
30.11.2012	245	-7	49
31.12.2012	249	-3	9
31.01.2013	254	2	4
28.02.2013	260	8	64
31.03.2013	261	9	81
30.04.2013	260	8	64
31.05.2013	259	7	49
30.06.2013	260	8	64
31.07.2013	261	9	81
31.08.2013	260	8	64
30.09.2013	259	7	49
31.10.2013	256	4	16
30.11.2013	252	0	0
31.12.2013	251	-1	1
31.01.2014	251	-1	1
28.02.2014	246	-6	36
31.03.2014	246	-6	36
30.04.2014	243	-9	81
31.05.2014	240	-12	144
30.06.2014	235	-17	289
31.07.2014	235	-17	289
31.08.2014	235	-17	289
30.09.2014	237	-15	225
31.10.2014	236	-16	256
30.11.2014	237	-15	225
31.12.2014	239	-13	169
31.01.2015	239	-13	169
Sum	16097		
Average	251.515625		
Round ($\bar{x}$)	252		
Count (n)	64		
$\Sigma(x- \bar{x})^2$	29599		
$\Sigma(x- \bar{x})^2/n$	462.484375		
variance	462.484375		
standard deviation	21.50544989		

Date	Liv-ex Investables (x)	(x- x̄)	(x- x̄)²
31.10.2004	98	-136	18496
30.11.2004	99	-135	18225
31.12.2004	99	-135	18225
31.01.2005	100	-134	17956
28.02.2005	101	-133	17689
31.03.2005	101	-133	17689
30.04.2005	102	-132	17424
31.05.2005	103	-131	17161
30.06.2005	103	-131	17161
31.07.2005	103	-131	17161
31.08.2005	107	-127	16129
30.09.2005	107	-127	16129
31.10.2005	112	-122	14884
30.11.2005	113	-121	14641
31.12.2005	113	-121	14641
31.01.2006	116	-118	13924
28.02.2006	119	-115	13225
31.03.2006	123	-111	12321
30.04.2006	125	-109	11881
31.05.2006	134	-100	10000
30.06.2006	142	-92	8464
31.07.2006	148	-86	7396
31.08.2006	151	-83	6889
30.09.2006	150	-84	7056
31.10.2006	156	-78	6084
30.11.2006	159	-75	5625
31.12.2006	163	-71	5041
31.01.2007	167	-67	4489
28.02.2007	173	-61	3721
31.03.2007	181	-53	2809
30.04.2007	194	-40	1600
31.05.2007	212	-22	484
30.06.2007	228	-6	36
31.07.2007	233	-1	1
31.08.2007	233	-1	1
30.09.2007	231	-3	9
31.10.2007	228	-6	36
30.11.2007	226	-8	64
31.12.2007	228	-6	36
31.01.2008	229	-5	25
29.02.2008	234	0	0
31.03.2008	238	4	16
30.04.2008	240	6	36
31.05.2008	243	9	81
30.06.2008	248	14	196
31.07.2008	247	13	169
31.08.2008	248	14	196
30.09.2008	240	6	36
31.10.2008	209	-25	625
30.11.2008	204	-30	900
31.12.2008	198	-36	1296
31.01.2009	202	-32	1024
28.02.2009	204	-30	900
31.03.2009	202	-32	1024
30.04.2009	208	-26	676
31.05.2009	209	-25	625
30.06.2009	210	-24	576
31.07.2009	212	-22	484
31.08.2009	220	-14	196
30.09.2009	225	-9	81
31.10.2009	230	-4	16
30.11.2009	232	-2	4
31.12.2009	235	1	1
31.01.2010	242	8	64
28.02.2010	249	15	225
31.03.2010	263	29	841
30.04.2010	277	43	1849
31.05.2010	289	55	3025
30.06.2010	296	62	3844
31.07.2010	295	61	3721
31.08.2010	298	64	4096
30.09.2010	304	70	4900
31.10.2010	313	79	6241
30.11.2010	326	92	8464
31.12.2010	334	100	10000
31.01.2011	347	113	12769
28.02.2011	360	126	15876
31.03.2011	363	129	16641
30.04.2011	364	130	16900
31.05.2011	365	131	17161
30.06.2011	370	136	18496
31.07.2011	365	131	17161
31.08.2011	352	118	13924
30.09.2011	334	100	10000
31.10.2011	320	86	7396
30.11.2011	310	76	5776
31.12.2011	300	66	4356
31.01.2012	302	68	4624
29.02.2012	305	71	5041
31.03.2012	305	71	5041
30.04.2012	302	68	4624
31.05.2012	289	55	3025
30.06.2012	277	43	1849
31.07.2012	271	37	1369
31.08.2012	271	37	1369
30.09.2012	274	40	1600
31.10.2012	273	39	1521
30.11.2012	273	39	1521
31.12.2012	276	42	1764
31.01.2013	283	49	2401
28.02.2013	290	56	3136
31.03.2013	292	58	3364
30.04.2013	290	56	3136
31.05.2013	290	56	3136
30.06.2013	290	56	3136
31.07.2013	289	55	3025
31.08.2013	289	55	3025
30.09.2013	286	52	2704
31.10.2013	283	49	2401
30.11.2013	277	43	1849
31.12.2013	276	42	1764
31.01.2014	275	41	1681
28.02.2014	271	37	1369
31.03.2014	268	34	1156
30.04.2014	265	31	961
31.05.2014	261	27	729
30.06.2014	255	21	441
31.07.2014	254	20	400
31.08.2014	255	21	441
30.09.2014	255	21	441
31.10.2014	255	21	441
30.11.2014	256	22	484
31.12.2014	256	22	484
31.01.2015	260	26	676
Sum	29023	**Σ(x- x̄)²**	663841
Average	234.0564516	**Σ(x- x̄)²/n**	535.556
Round (x̄)	234	**variance**	535.556
Count (n)	124	**standard deviation**	73.168

Date	Champagne 50 (x)	(x- x̄)	(x- x̄)²
28.02.2005	117	-94	8836
31.03.2005	121	-90	8100
30.04.2005	121	-90	8100
31.05.2005	121	-90	8100
30.06.2005	123	-88	7744
31.07.2005	121	-90	8100
31.08.2005	120	-91	8281
30.09.2005	121	-90	8100
31.10.2005	120	-91	8281
30.11.2005	126	-85	7225
31.12.2005	126	-85	7225
31.01.2006	128	-83	6889
28.02.2006	128	-83	6889
31.03.2006	132	-79	6241
30.04.2006	132	-79	6241
31.05.2006	136	-75	5625
30.06.2006	136	-75	5625
31.07.2006	137	-74	5476
31.08.2006	140	-71	5041
30.09.2006	141	-70	4900
31.10.2006	150	-61	3721
30.11.2006	151	-60	3600
31.12.2006	152	-59	3481
31.01.2007	152	-59	3481
28.02.2007	153	-58	3364
31.03.2007	155	-56	3136
30.04.2007	161	-50	2500
31.05.2007	170	-41	1681
30.06.2007	172	-39	1521
31.07.2007	173	-38	1444
31.08.2007	177	-34	1156
30.09.2007	183	-28	784
31.10.2007	182	-29	841
30.11.2007	187	-24	576
31.12.2007	193	-18	324
31.01.2008	192	-19	361
29.02.2008	198	-13	169
31.03.2008	200	-11	121
30.04.2008	203	-8	64
31.05.2008	203	-8	64
30.06.2008	206	-5	25
31.07.2008	209	-2	4
31.08.2008	210	-1	1
30.09.2008	210	-1	1
31.10.2008	211	0	0
30.11.2008	210	-1	1
31.12.2008	206	-5	25
31.01.2009	208	-3	9
28.02.2009	208	-3	9
31.03.2009	207	-4	16
30.04.2009	206	-5	25
31.05.2009	214	3	9
30.06.2009	208	-3	9
31.07.2009	205	-6	36
31.08.2009	202	-9	81
30.09.2009	206	-5	25
31.10.2009	204	-7	49
30.11.2009	207	-4	16
31.12.2009	207	-4	16
31.01.2010	208	-3	9
28.02.2010	207	-4	16
31.03.2010	208	-3	9
30.04.2010	208	-3	9
31.05.2010	213	2	4
30.06.2010	220	9	81
31.07.2010	225	14	196
31.08.2010	232	21	441
30.09.2010	232	21	441
31.10.2010	232	21	441
30.11.2010	231	20	400
31.12.2010	237	26	676
31.01.2011	237	26	676
28.02.2011	234	23	529
31.03.2011	235	24	576
30.04.2011	236	25	625
31.05.2011	237	26	676
30.06.2011	242	31	961
31.07.2011	244	33	1089
31.08.2011	244	33	1089
30.09.2011	250	39	1521
31.10.2011	249	38	1444
30.11.2011	250	39	1521
31.12.2011	248	37	1369
31.01.2012	252	41	1681
29.02.2012	249	38	1444
31.03.2012	244	33	1089
30.04.2012	248	37	1369
31.05.2012	246	35	1225
30.06.2012	248	37	1369
31.07.2012	249	38	1444
31.08.2012	242	31	961
30.09.2012	250	39	1521
31.10.2012	249	38	1444
30.11.2012	247	36	1296
31.12.2012	252	41	1681
31.01.2013	255	44	1936
28.02.2013	260	49	2401
31.03.2013	264	53	2809
30.04.2013	266	55	3025
31.05.2013	266	55	3025
30.06.2013	271	60	3600
31.07.2013	275	64	4096
31.08.2013	273	62	3844
30.09.2013	273	62	3844
31.10.2013	271	60	3600
30.11.2013	274	63	3969
31.12.2013	276	65	4225
31.01.2014	274	63	3969
28.02.2014	271	60	3600
31.03.2014	273	62	3844
30.04.2014	272	61	3721
31.05.2014	270	59	3481
30.06.2014	270	59	3481
31.07.2014	268	57	3249
31.08.2014	264	53	2809
30.09.2014	268	57	3249
31.10.2014	274	63	3969
30.11.2014	276	65	4225
31.12.2014	272	61	3721
31.01.2015	277	66	4356
Sum	25286		
Average	210.7166667		
Round (x̄)	211		
Count (n)	120		
Σ(x- x̄)²	293136		
Σ(x- x̄)²/n	2442.8		
variance	2442.8		
standard deviation	49.42469019		

Date	Liv-ex fine wine 1000 (x)	$(x- \bar{x})$	$(x- \bar{x})^2$
31.10.2009	202	-46	2116
30.11.2009	204	-44	1936
31.12.2009	207	-41	1681
31.01.2010	211	-37	1369
28.02.2010	215	-33	1089
31.03.2010	220	-28	784
30.04.2010	224	-24	576
31.05.2010	229	-19	361
30.06.2010	232	-16	256
31.07.2010	233	-15	225
31.08.2010	235	-13	169
30.09.2010	238	-10	100
31.10.2010	242	-6	36
30.11.2010	247	-1	1
31.12.2010	254	6	36
31.01.2011	258	10	100
28.02.2011	264	16	256
31.03.2011	267	19	361
30.04.2011	271	23	529
31.05.2011	275	27	729
30.06.2011	279	31	961
31.07.2011	280	32	1024
31.08.2011	273	25	625
30.09.2011	267	19	361
31.10.2011	260	12	144
30.11.2011	255	7	49
31.12.2011	253	5	25
31.01.2012	255	7	49
29.02.2012	257	9	81
31.03.2012	257	9	81
30.04.2012	256	8	64
31.05.2012	251	3	9
30.06.2012	245	-3	9
31.07.2012	243	-5	25
31.08.2012	243	-5	25
30.09.2012	244	-4	16
31.10.2012	244	-4	16
30.11.2012	245	-3	9
31.12.2012	247	-1	1
31.01.2013	252	4	16
28.02.2013	257	9	81
31.03.2013	257	9	81
30.04.2013	257	9	81
31.05.2013	257	9	81
30.06.2013	259	11	121
31.07.2013	259	11	121
31.08.2013	259	11	121
30.09.2013	259	11	121
31.10.2013	258	10	100
30.11.2013	256	8	64
31.12.2013	255	7	49
31.01.2014	252	4	16
28.02.2014	250	2	4
31.03.2014	250	2	4
30.04.2014	248	0	0
31.05.2014	246	-2	4
30.06.2014	244	-4	16
31.07.2014	243	-5	25
31.08.2014	243	-5	25
30.09.2014	243	-5	25
31.10.2014	243	-5	25
30.11.2014	243	-5	25
31.12.2014	243	-5	25
31.01.2015	245	-3	9
Sum	15860		
Average	247.8125		
Round ($\bar{x}$)	248		
Count (n)	64		
$\Sigma(x- \bar{x})^2$	17524		
$\Sigma(x- \bar{x})^2/n$	273.8125		
variance	273.8125		
standard deviation	16.54728074		

Appendix C: Coefficient of correlation calculations

Pre-crisis correlations of Liv-ex Investables

Date	Liv-ex Investables	Returns	Inflation rate
31.10.2004	98		1.20%
30.11.2004	99	1.02%	1.40%
31.12.2004	99	0.00%	1.60%
31.01.2005	100	1.01%	1.60%
28.02.2005	101	1.00%	1.60%
31.03.2005	101	0.00%	2.00%
30.04.2005	102	0.99%	1.90%
31.05.2005	103	0.98%	1.90%
30.06.2005	103	0.00%	1.90%
31.07.2005	103	0.00%	2.40%
31.08.2005	107	3.88%	2.30%
30.09.2005	107	0.00%	2.40%
31.10.2005	112	4.67%	2.30%
30.11.2005	113	0.89%	2.10%
31.12.2005	113	0.00%	1.90%
31.01.2006	116	2.65%	1.90%
28.02.2006	119	2.59%	2.10%
31.03.2006	123	3.36%	1.80%
30.04.2006	125	1.63%	2.00%
31.05.2006	134	7.20%	2.20%
30.06.2006	142	5.97%	2.50%
31.07.2006	148	4.23%	2.40%
31.08.2006	151	2.03%	2.50%
30.09.2006	150	-0.66%	2.40%
31.10.2006	156	4.00%	2.50%
30.11.2006	159	1.92%	2.70%
31.12.2006	163	2.52%	3.00%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.336692	1

Returns	FTSE all	Returns	FTSE 100
	2.07%		1.71%
1.02%	2.79%	1.02%	2.36%
0.00%	1.26%	0.00%	0.79%
1.01%	2.22%	1.01%	2.39%
1.00%	-1.51%	1.00%	-1.49%
0.00%	-2.47%	0.00%	-1.89%
0.99%	3.60%	0.99%	3.38%
0.98%	3.09%	0.98%	3.01%
0.00%	3.30%	0.00%	3.31%
0.00%	0.55%	0.00%	0.28%
3.88%	3.26%	3.88%	3.41%
0.00%	-2.96%	0.00%	-2.93%
4.67%	2.88%	4.67%	1.99%
0.89%	3.87%	0.89%	3.61%
0.00%	2.86%	0.00%	2.52%
2.65%	0.94%	2.65%	0.54%
2.59%	3.11%	2.59%	2.99%
3.36%	0.86%	3.36%	0.98%
1.63%	-5.12%	1.63%	-4.97%
7.20%	1.74%	7.20%	1.91%
5.97%	1.24%	5.97%	1.63%
4.23%	0.11%	4.23%	-0.37%
2.03%	1.43%	2.03%	0.93%
-0.66%	2.95%	-0.66%	2.83%
4.00%	-0.66%	4.00%	-1.31%
1.92%	3.26%	1.92%	2.84%
2.52%	-0.30%	2.52%	-0.28%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.039386	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.040097	1

Pre-crisis correlations of Champagne 50

Date	Champagne 500	Return	Inflation rate
28.02.2005	117		1.60%
31.03.2005	121	3.42%	2.00%
30.04.2005	121	0.00%	1.90%
31.05.2005	121	0.00%	1.90%
30.06.2005	123	1.65%	1.90%
31.07.2005	121	-1.63%	2.40%
31.08.2005	120	-0.83%	2.30%
30.09.2005	121	0.83%	2.40%
31.10.2005	120	-0.83%	2.30%
30.11.2005	126	5.00%	2.10%
31.12.2005	126	0.00%	1.90%
31.01.2006	128	1.59%	1.90%
28.02.2006	128	0.00%	2.10%
31.03.2006	132	3.13%	1.80%
30.04.2006	132	0.00%	2.00%
31.05.2006	136	3.03%	2.20%
30.06.2006	136	0.00%	2.50%
31.07.2006	137	0.74%	2.40%
31.08.2006	140	2.19%	2.50%
30.09.2006	141	0.71%	2.40%
31.10.2006	150	6.38%	2.50%
30.11.2006	151	0.67%	2.70%
31.12.2006	152	0.66%	3.00%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.06687	1

Return	FTSE all	Return	FTSE 100
	-1.51%		-1.49%
3.42%	-2.47%	3.42%	-1.89%
0.00%	3.60%	0.00%	3.38%
0.00%	3.09%	0.00%	3.01%
1.65%	3.30%	1.65%	3.31%
-1.63%	0.55%	-1.63%	0.28%
-0.83%	3.26%	-0.83%	3.41%
0.83%	-2.96%	0.83%	-2.93%
-0.83%	2.88%	-0.83%	1.99%
5.00%	3.87%	5.00%	3.61%
0.00%	2.86%	0.00%	2.52%
1.59%	0.94%	1.59%	0.54%
0.00%	3.11%	0.00%	2.99%
3.13%	0.86%	3.13%	0.98%
0.00%	-5.12%	0.00%	-4.97%
3.03%	1.74%	3.03%	1.91%
0.00%	1.24%	0.00%	1.63%
0.74%	0.11%	0.74%	-0.37%
2.19%	1.43%	2.19%	0.93%
0.71%	2.95%	0.71%	2.83%
6.38%	-0.66%	6.38%	-1.31%
0.67%	3.26%	0.67%	2.84%
0.66%	-0.30%	0.66%	-0.28%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.13165	1

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.13817	1

Financial crisis correlations of Liv-ex Investables

Date	Liv-ex Investables	Returns	Inflation
31.01.2007	167	2.45%	2.70%
28.02.2007	173	3.59%	2.80%
31.03.2007	181	4.62%	3.10%
30.04.2007	194	7.18%	2.80%
31.05.2007	212	9.28%	2.50%
30.06.2007	228	7.55%	2.40%
31.07.2007	233	2.19%	1.90%
31.08.2007	233	0.00%	1.70%
30.09.2007	231	-0.86%	1.70%
31.10.2007	228	-1.30%	2.00%
30.11.2007	226	-0.88%	2.10%
31.12.2007	228	0.88%	2.10%
31.01.2008	229	0.44%	2.20%
29.02.2008	234	2.18%	2.50%
31.03.2008	238	1.71%	2.40%
30.04.2008	240	0.84%	3.00%
31.05.2008	243	1.25%	3.30%
30.06.2008	248	2.06%	3.80%
31.07.2008	247	-0.40%	4.40%
31.08.2008	248	0.40%	4.80%
30.09.2008	240	-3.23%	5.20%
31.10.2008	209	-12.92%	4.50%
30.11.2008	204	-2.39%	4.10%
31.12.2008	198	-2.94%	3.10%
31.01.2009	202	2.02%	3.00%
28.02.2009	204	0.99%	3.10%
31.03.2009	202	-0.98%	2.90%
30.04.2009	208	2.97%	2.30%
31.05.2009	209	0.48%	2.20%
30.06.2009	210	0.48%	1.80%
31.07.2009	212	0.95%	1.70%
31.08.2009	220	3.77%	1.50%
30.09.2009	225	2.27%	1.10%
31.10.2009	230	2.22%	1.50%
30.11.2009	232	0.87%	1.90%
31.12.2009	235	1.29%	2.80%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.38817	1

Returns	FTSE all share	Returns	FTSE 100
2.45%	-0.30%	2.45%	-0.28%
3.59%	-0.42%	3.59%	-0.51%
4.62%	2.66%	4.62%	2.21%
7.18%	2.20%	7.18%	2.24%
9.28%	2.48%	9.28%	2.67%
7.55%	-1.01%	7.55%	-0.21%
2.19%	-3.38%	2.19%	-3.75%
0.00%	-0.87%	0.00%	-0.89%
-0.86%	1.73%	-0.86%	2.59%
-1.30%	4.14%	-1.30%	3.94%
-0.88%	-5.02%	-0.88%	-4.30%
0.88%	0.18%	0.88%	0.38%
0.44%	-8.72%	0.44%	-8.94%
2.18%	0.43%	2.18%	0.08%
1.71%	-2.85%	1.71%	-3.10%
0.84%	5.91%	0.84%	6.76%
1.25%	-0.57%	1.25%	-0.56%
2.06%	-7.35%	2.06%	-7.06%
-0.40%	-3.73%	-0.40%	-3.80%
0.40%	4.35%	0.40%	4.15%
-3.23%	-13.42%	-3.23%	-13.02%
-12.92%	-12.08%	-12.92%	-10.71%
-2.39%	-2.28%	-2.39%	-2.04%
-2.94%	3.53%	-2.94%	3.41%
2.02%	-5.90%	2.02%	-6.42%
0.99%	-7.18%	0.99%	-7.70%
-0.98%	2.82%	-0.98%	2.51%
2.97%	9.52%	2.97%	8.09%
0.48%	3.66%	0.48%	4.10%
0.48%	-3.58%	0.48%	-3.82%
0.95%	8.35%	0.95%	8.45%
3.77%	7.10%	3.77%	6.52%
2.27%	4.53%	2.27%	4.58%
2.22%	-1.91%	2.22%	-1.74%
0.87%	2.47%	0.87%	2.90%
1.29%	4.24%	1.29%	4.28%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.411426	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.38621	1

Financial crisis correlations of Champagne 50

Date	Champagne	Returns	Inflation
31.01.2007	152	0.00%	2.70%
28.02.2007	153	0.66%	2.80%
31.03.2007	155	1.31%	3.10%
30.04.2007	161	3.87%	2.80%
31.05.2007	170	5.59%	2.50%
30.06.2007	172	1.18%	2.40%
31.07.2007	173	0.58%	1.90%
31.08.2007	177	2.31%	1.70%
30.09.2007	183	3.39%	1.70%
31.10.2007	182	-0.55%	2.00%
30.11.2007	187	2.75%	2.10%
31.12.2007	193	3.21%	2.10%
31.01.2008	192	-0.52%	2.20%
29.02.2008	198	3.13%	2.50%
31.03.2008	200	1.01%	2.40%
30.04.2008	203	1.50%	3.00%
31.05.2008	203	0.00%	3.30%
30.06.2008	206	1.48%	3.80%
31.07.2008	209	1.46%	4.40%
31.08.2008	210	0.48%	4.80%
30.09.2008	210	0.00%	5.20%
31.10.2008	211	0.48%	4.50%
30.11.2008	210	-0.47%	4.10%
31.12.2008	206	-1.90%	3.10%
31.01.2009	208	0.97%	3.00%
28.02.2009	208	0.00%	3.10%
31.03.2009	207	-0.48%	2.90%
30.04.2009	206	-0.48%	2.30%
31.05.2009	214	3.88%	2.20%
30.06.2009	208	-2.80%	1.80%
31.07.2009	205	-1.44%	1.70%
31.08.2009	202	-1.46%	1.50%
30.09.2009	206	1.98%	1.10%
31.10.2009	204	-0.97%	1.50%
30.11.2009	207	1.47%	1.90%
31.12.2009	207	0.00%	2.80%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.06882	1

Returns	FTSE all share	Returns	FTSE 100
0.00%	-0.30%	0.00%	-0.28%
0.66%	-0.42%	0.66%	-0.51%
1.31%	2.66%	1.31%	2.21%
3.87%	2.20%	3.87%	2.24%
5.59%	2.48%	5.59%	2.67%
1.18%	-1.01%	1.18%	-0.21%
0.58%	-3.38%	0.58%	-3.75%
2.31%	-0.87%	2.31%	-0.89%
3.39%	1.73%	3.39%	2.59%
-0.55%	4.14%	-0.55%	3.94%
2.75%	-5.02%	2.75%	-4.30%
3.21%	0.18%	3.21%	0.38%
-0.52%	-8.72%	-0.52%	-8.94%
3.13%	0.43%	3.13%	0.08%
1.01%	-2.85%	1.01%	-3.10%
1.50%	5.91%	1.50%	6.76%
0.00%	-0.57%	0.00%	-0.56%
1.48%	-7.35%	1.48%	-7.06%
1.46%	-3.73%	1.46%	-3.80%
0.48%	4.35%	0.48%	4.15%
0.00%	-13.42%	0.00%	-13.02%
0.48%	-12.08%	0.48%	-10.71%
-0.47%	-2.28%	-0.47%	-2.04%
-1.90%	3.53%	-1.90%	3.41%
0.97%	-5.90%	0.97%	-6.42%
0.00%	-7.18%	0.00%	-7.70%
-0.48%	2.82%	-0.48%	2.51%
-0.48%	9.52%	-0.48%	8.09%
3.88%	3.66%	3.88%	4.10%
-2.80%	-3.58%	-2.80%	-3.82%
-1.44%	8.35%	-1.44%	8.45%
-1.46%	7.10%	-1.46%	6.52%
1.98%	4.53%	1.98%	4.58%
-0.97%	-1.91%	-0.97%	-1.74%
1.47%	2.47%	1.47%	2.90%
0.00%	4.24%	0.00%	4.28%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.031238	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.064688	1

Post-crisis correlations of Liv-ex fine wine 100

Date	Liv-ex fine wine 100	Return	Inflation
31.01.2010	246		3.40%
28.02.2010	253	2.85%	3.00%
31.03.2010	267	5.53%	3.40%
30.04.2010	284	6.37%	3.70%
31.05.2010	296	4.23%	3.30%
30.06.2010	305	3.04%	3.20%
31.07.2010	301	-1.31%	3.10%
31.08.2010	304	1.00%	3.10%
30.09.2010	308	1.32%	3.00%
31.10.2010	316	2.60%	3.10%
30.11.2010	329	4.11%	3.20%
31.12.2010	336	2.13%	3.70%
31.01.2011	346	2.98%	4.00%
28.02.2011	357	3.18%	4.30%
31.03.2011	359	0.56%	4.10%
30.04.2011	359	0.00%	4.50%
31.05.2011	359	0.00%	4.50%
30.06.2011	365	1.67%	4.20%
31.07.2011	359	-1.64%	4.50%
31.08.2011	345	-3.90%	4.50%
30.09.2011	323	-6.38%	5.20%
31.10.2011	308	-4.64%	5.00%
30.11.2011	298	-3.25%	4.80%
31.12.2011	286	-4.03%	4.20%
31.01.2012	290	1.40%	3.60%
29.02.2012	294	1.38%	3.40%
31.03.2012	294	0.00%	3.50%
30.04.2012	290	-1.36%	3.00%
31.05.2012	278	-4.14%	2.80%
30.06.2012	265	-4.68%	2.40%
31.07.2012	258	-2.64%	2.60%
31.08.2012	259	0.39%	2.50%
30.09.2012	260	0.39%	2.20%
31.10.2012	258	-0.77%	2.60%
30.11.2012	258	0.00%	2.60%
31.12.2012	261	1.16%	2.70%
31.01.2013	268	2.68%	2.70%
28.02.2013	276	2.99%	2.80%
31.03.2013	280	1.45%	2.80%
30.04.2013	276	-1.43%	2.40%
31.05.2013	275	-0.36%	2.70%
30.06.2013	274	-0.36%	2.90%
31.07.2013	273	-0.36%	2.80%
31.08.2013	273	0.00%	2.70%
30.09.2013	268	-1.83%	2.70%
31.10.2013	265	-1.12%	2.20%
30.11.2013	258	-2.64%	2.10%
31.12.2013	257	-0.39%	2.00%
31.01.2014	255	-0.78%	1.90%
28.02.2014	253	-0.78%	1.70%
31.03.2014	249	-1.58%	1.60%
30.04.2014	247	-0.80%	1.80%
31.05.2014	243	-1.62%	1.50%
30.06.2014	236	-2.88%	1.90%
31.07.2014	234	-0.85%	1.60%
31.08.2014	236	0.85%	1.50%
30.09.2014	237	0.42%	1.20%
31.10.2014	238	0.42%	1.30%
30.11.2014	239	0.42%	1.00%
31.12.2014	239	0.00%	0.50%
31.01.2015	243	1.67%	0.30%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.05224	1

Return	FTSE all share	Return	FTSE 100
	2.87%		-4.15%
2.85%	6.34%	2.85%	3.20%
5.53%	-1.61%	5.53%	6.07%
6.37%	-6.64%	6.37%	-2.22%
4.23%	-4.85%	4.23%	-6.57%
3.04%	6.76%	3.04%	-5.23%
-1.31%	-0.69%	-1.31%	6.94%
1.00%	6.34%	1.00%	-0.62%
1.32%	2.39%	1.32%	6.19%
2.60%	-2.54%	2.60%	2.28%
4.11%	7.03%	4.11%	-2.59%
2.13%	-0.61%	2.13%	6.72%
2.98%	2.05%	2.98%	-0.63%
3.18%	-1.25%	3.18%	2.24%
0.56%	2.85%	0.56%	-1.42%
0.00%	-1.08%	0.00%	2.73%
0.00%	-0.78%	0.00%	-1.32%
1.67%	-2.28%	1.67%	-0.74%
-1.64%	-7.45%	-1.64%	-2.19%
-3.90%	-5.22%	-3.90%	-7.23%
-6.38%	7.78%	-6.38%	-4.93%
-4.64%	-0.87%	-4.64%	8.11%
-3.25%	0.78%	-3.25%	-0.70%
-4.03%	2.63%	-4.03%	1.22%
1.40%	3.78%	1.40%	1.96%
1.38%	-1.35%	1.38%	3.34%
0.00%	-0.60%	0.00%	-1.75%
-1.36%	-7.29%	-1.36%	-0.53%
-4.14%	4.49%	-4.14%	-7.27%
-4.68%	1.24%	-4.68%	4.70%
-2.64%	1.55%	-2.64%	1.15%
0.39%	0.88%	0.39%	1.35%
0.39%	0.85%	0.39%	0.54%
-0.77%	1.35%	-0.77%	0.71%
0.00%	0.92%	0.00%	1.45%
1.16%	6.27%	1.16%	0.53%
2.68%	1.89%	2.68%	6.43%
2.99%	0.93%	2.99%	1.34%
1.45%	0.28%	1.45%	0.80%
-1.43%	2.47%	-1.43%	0.29%
-0.36%	-5.30%	-0.36%	2.38%
-0.36%	6.69%	-0.36%	-5.58%
-0.36%	-2.84%	-0.36%	6.53%
0.00%	0.98%	0.00%	-3.14%
-1.83%	4.11%	-1.83%	0.77%
-1.12%	-1.03%	-1.12%	4.17%
-2.64%	1.72%	-2.64%	-1.20%
-0.39%	-3.13%	-0.39%	1.48%
-0.78%	4.87%	-0.78%	-3.54%
-0.78%	-3.03%	-0.78%	4.60%
-1.58%	1.81%	-1.58%	-3.10%
-0.80%	0.97%	-0.80%	2.75%
-1.62%	-1.50%	-1.62%	0.95%
-2.88%	-0.40%	-2.88%	-1.47%
-0.85%	1.50%	-0.85%	-0.20%
0.85%	-2.90%	0.85%	1.33%
0.42%	-0.86%	0.42%	-2.89%
0.42%	2.56%	0.42%	-1.15%
0.42%	-1.69%	0.42%	2.69%
0.00%	2.52%	0.00%	-2.33%
1.67%	1.80%	1.67%	2.79%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.081705093	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.112456	1

Post-crisis correlations of Champagne 50

Champagne	Return	Inflation
208	0.48%	3.40%
207	-0.48%	3.00%
208	0.48%	3.40%
208	0.00%	3.70%
213	2.40%	3.30%
220	3.29%	3.20%
225	2.27%	3.10%
232	3.11%	3.10%
232	0.00%	3.00%
232	0.00%	3.10%
231	-0.43%	3.20%
237	2.60%	3.70%
237	0.00%	4.00%
234	-1.27%	4.30%
235	0.43%	4.10%
236	0.43%	4.50%
237	0.42%	4.50%
242	2.11%	4.20%
244	0.83%	4.50%
244	0.00%	4.50%
250	2.46%	5.20%
249	-0.40%	5.00%
250	0.40%	4.80%
248	-0.80%	4.20%
252	1.61%	3.60%
249	-1.19%	3.40%
244	-2.01%	3.50%
248	1.64%	3.00%
246	-0.81%	2.80%
248	0.81%	2.40%
249	0.40%	2.60%
242	-2.81%	2.50%
250	3.31%	2.20%
249	-0.40%	2.60%
247	-0.80%	2.60%
252	2.02%	2.70%
255	1.19%	2.70%
260	1.96%	2.80%
264	1.54%	2.80%
266	0.76%	2.40%
266	0.00%	2.70%
271	1.88%	2.90%
275	1.48%	2.80%
273	-0.73%	2.70%
273	0.00%	2.70%
271	-0.73%	2.20%
274	1.11%	2.10%
276	0.73%	2.00%
274	-0.72%	1.90%
271	-1.09%	1.70%
273	0.74%	1.60%
272	-0.37%	1.80%
270	-0.74%	1.50%
270	0.00%	1.90%
268	-0.74%	1.60%
264	-1.49%	1.50%
268	1.52%	1.20%
274	2.24%	1.30%
276	0.73%	1.00%
272	-1.45%	0.50%
277	1.84%	0.30%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.082106	1

Return	FTSE all share	Return	FTSE 100
0.48%	2.87%	0.48%	-4.15%
-0.48%	6.34%	-0.48%	3.20%
0.48%	-1.61%	0.48%	6.07%
0.00%	-6.64%	0.00%	-2.22%
2.40%	-4.85%	2.40%	-6.57%
3.29%	6.76%	3.29%	-5.23%
2.27%	-0.69%	2.27%	6.94%
3.11%	6.34%	3.11%	-0.62%
0.00%	2.39%	0.00%	6.19%
0.00%	-2.54%	0.00%	2.28%
-0.43%	7.03%	-0.43%	-2.59%
2.60%	-0.61%	2.60%	6.72%
0.00%	2.05%	0.00%	-0.63%
-1.27%	-1.25%	-1.27%	2.24%
0.43%	2.85%	0.43%	-1.42%
0.43%	-1.08%	0.43%	2.73%
0.42%	-0.78%	0.42%	-1.32%
2.11%	-2.28%	2.11%	-0.74%
0.83%	-7.45%	0.83%	-2.19%
0.00%	-5.22%	0.00%	-7.23%
2.46%	7.78%	2.46%	-4.93%
-0.40%	-0.87%	-0.40%	8.11%
0.40%	0.78%	0.40%	-0.70%
-0.80%	2.63%	-0.80%	1.22%
1.61%	3.78%	1.61%	1.96%
-1.19%	-1.35%	-1.19%	3.34%
-2.01%	-0.60%	-2.01%	-1.75%
1.64%	-7.29%	1.64%	-0.53%
-0.81%	4.49%	-0.81%	-7.27%
0.81%	1.24%	0.81%	4.70%

0.40%	1.55%	0.40%	1.15%
-2.81%	0.88%	-2.81%	1.35%
3.31%	0.85%	3.31%	0.54%
-0.40%	1.35%	-0.40%	0.71%
-0.80%	0.92%	-0.80%	1.45%
2.02%	6.27%	2.02%	0.53%
1.19%	1.89%	1.19%	6.43%
1.96%	0.93%	1.96%	1.34%
1.54%	0.28%	1.54%	0.80%
0.76%	2.47%	0.76%	0.29%
0.00%	-5.30%	0.00%	2.38%
1.88%	6.69%	1.88%	-5.58%
1.48%	-2.84%	1.48%	6.53%
-0.73%	0.98%	-0.73%	-3.14%
0.00%	4.11%	0.00%	0.77%
-0.73%	-1.03%	-0.73%	4.17%
1.11%	1.72%	1.11%	-1.20%
0.73%	-3.13%	0.73%	1.48%
-0.72%	4.87%	-0.72%	-3.54%
-1.09%	-3.03%	-1.09%	4.60%
0.74%	1.81%	0.74%	-3.10%
-0.37%	0.97%	-0.37%	2.75%
-0.74%	-1.50%	-0.74%	0.95%
0.00%	-0.40%	0.00%	-1.47%
-0.74%	1.50%	-0.74%	-0.20%
-1.49%	-2.90%	-1.49%	1.33%
1.52%	-0.86%	1.52%	-2.89%
2.24%	2.56%	2.24%	-1.15%
0.73%	-1.69%	0.73%	2.69%
-1.45%	2.52%	-1.45%	-2.33%
1.84%	1.80%	1.84%	2.79%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.145094405	1

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.07524	1

Post-crisis correlations of Liv-ex Bordeaux 500

Date	Liv-ex Bordeaux 500	Return	Inflation
30.11.2009	200	0.50%	1.90%
31.12.2009	207	3.50%	2.80%
31.01.2010	212	2.42%	3.40%
28.02.2010	216	1.89%	3.00%
31.03.2010	224	3.70%	3.40%
30.04.2010	228	1.79%	3.70%
31.05.2010	233	2.19%	3.30%
30.06.2010	238	2.15%	3.20%
31.07.2010	238	0.00%	3.10%
31.08.2010	247	3.78%	3.10%
30.09.2010	244	-1.21%	3.00%
31.10.2010	250	2.46%	3.10%
30.11.2010	258	3.20%	3.20%
31.12.2010	267	3.49%	3.70%
31.01.2011	272	1.87%	4.00%
28.02.2011	280	2.94%	4.30%
31.03.2011	285	1.79%	4.10%
30.04.2011	290	1.75%	4.50%
31.05.2011	294	1.38%	4.50%
30.06.2011	298	1.36%	4.20%
31.07.2011	300	0.67%	4.50%
31.08.2011	291	-3.00%	4.50%
30.09.2011	282	-3.09%	5.20%
31.10.2011	272	-3.55%	5.00%
30.11.2011	266	-2.21%	4.80%
31.12.2011	262	-1.50%	4.20%
31.01.2012	264	0.76%	3.60%
29.02.2012	266	0.76%	3.40%
31.03.2012	264	-0.75%	3.50%
30.04.2012	263	-0.38%	3.00%
31.05.2012	256	-2.66%	2.80%
30.06.2012	247	-3.52%	2.40%
31.07.2012	243	-1.62%	2.60%
31.08.2012	244	0.41%	2.50%
30.09.2012	246	0.82%	2.20%
31.10.2012	245	-0.41%	2.60%
30.11.2012	245	0.00%	2.60%
31.12.2012	249	1.63%	2.70%
31.01.2013	254	2.01%	2.70%
28.02.2013	260	2.36%	2.80%
31.03.2013	261	0.38%	2.80%
30.04.2013	260	-0.38%	2.40%
31.05.2013	259	-0.38%	2.70%
30.06.2013	260	0.39%	2.90%
31.07.2013	261	0.38%	2.80%
31.08.2013	260	-0.38%	2.70%
30.09.2013	259	-0.38%	2.70%
31.10.2013	256	-1.16%	2.20%
30.11.2013	252	-1.56%	2.10%
31.12.2013	251	-0.40%	2.00%
31.01.2014	251	0.00%	1.90%
28.02.2014	246	-1.99%	1.70%
31.03.2014	246	0.00%	1.60%
30.04.2014	243	-1.22%	1.80%
31.05.2014	240	-1.23%	1.50%
30.06.2014	235	-2.08%	1.90%
31.07.2014	235	0.00%	1.60%
31.08.2014	235	0.00%	1.50%
30.09.2014	237	0.85%	1.20%
31.10.2014	236	-0.42%	1.30%
30.11.2014	237	0.42%	1.00%
31.12.2014	239	0.84%	0.50%
31.01.2015	239	0.00%	0.30%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.079924	1

Return	FTSE all share	Return	FTSE 100
0.50%	4.24%	0.50%	2.90%
3.50%	-3.63%	3.50%	4.28%
2.42%	2.87%	2.42%	-4.15%
1.89%	6.34%	1.89%	3.20%
3.70%	-1.61%	3.70%	6.07%
1.79%	-6.64%	1.79%	-2.22%
2.19%	-4.85%	2.19%	-6.57%
2.15%	6.76%	2.15%	-5.23%
0.00%	-0.69%	0.00%	6.94%
3.78%	6.34%	3.78%	-0.62%
-1.21%	2.39%	-1.21%	6.19%
2.46%	-2.54%	2.46%	2.28%
3.20%	7.03%	3.20%	-2.59%
3.49%	-0.61%	3.49%	6.72%
1.87%	2.05%	1.87%	-0.63%
2.94%	-1.25%	2.94%	2.24%
1.79%	2.85%	1.79%	-1.42%
1.75%	-1.08%	1.75%	2.73%
1.38%	-0.78%	1.38%	-1.32%
1.36%	-2.28%	1.36%	-0.74%
0.67%	-7.45%	0.67%	-2.19%
-3.00%	-5.22%	-3.00%	-7.23%
-3.09%	7.78%	-3.09%	-4.93%
-3.55%	-0.87%	-3.55%	8.11%
-2.21%	0.78%	-2.21%	-0.70%
-1.50%	2.63%	-1.50%	1.22%
0.76%	3.78%	0.76%	1.96%
0.76%	-1.35%	0.76%	3.34%
-0.75%	-0.60%	-0.75%	-1.75%
-0.38%	-7.29%	-0.38%	-0.53%
-2.66%	4.49%	-2.66%	-7.27%

-3.52%	1.24%	-3.52%	4.70%
-1.62%	1.55%	-1.62%	1.15%
0.41%	0.88%	0.41%	1.35%
0.82%	0.85%	0.82%	0.54%
-0.41%	1.35%	-0.41%	0.71%
0.00%	0.92%	0.00%	1.45%
1.63%	6.27%	1.63%	0.53%
2.01%	1.89%	2.01%	6.43%
2.36%	0.93%	2.36%	1.34%
0.38%	0.28%	0.38%	0.80%
-0.38%	2.47%	-0.38%	0.29%
-0.38%	-5.30%	-0.38%	2.38%
0.39%	6.69%	0.39%	-5.58%
0.38%	-2.84%	0.38%	6.53%
-0.38%	0.98%	-0.38%	-3.14%
-0.38%	4.11%	-0.38%	0.77%
-1.16%	-1.03%	-1.16%	4.17%
-1.56%	1.72%	-1.56%	-1.20%
-0.40%	-3.13%	-0.40%	1.48%
0.00%	4.87%	0.00%	-3.54%
-1.99%	-3.03%	-1.99%	4.60%
0.00%	1.81%	0.00%	-3.10%
-1.22%	0.97%	-1.22%	2.75%
-1.23%	-1.50%	-1.23%	0.95%
-2.08%	-0.40%	-2.08%	-1.47%
0.00%	1.50%	0.00%	-0.20%
0.00%	-2.90%	0.00%	1.33%
0.85%	-0.86%	0.85%	-2.89%
-0.42%	2.56%	-0.42%	-1.15%
0.42%	-1.69%	0.42%	2.69%
0.84%	2.52%	0.84%	-2.33%
0.00%	1.80%	0.00%	2.79%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.030113164	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.062184	1

Post-crisis correlations of Liv-ex Investables

Date	Investables	Return	Inflation
31.01.2010	242	2.98%	3.40%
28.02.2010	249	2.89%	3.00%
31.03.2010	263	5.62%	3.40%
30.04.2010	277	5.32%	3.70%
31.05.2010	289	4.33%	3.30%
30.06.2010	296	2.42%	3.20%
31.07.2010	295	-0.34%	3.10%
31.08.2010	298	1.02%	3.10%
30.09.2010	304	2.01%	3.00%
31.10.2010	313	2.96%	3.10%
30.11.2010	326	4.15%	3.20%
31.12.2010	334	2.45%	3.70%
31.01.2011	347	3.89%	4.00%
28.02.2011	360	3.75%	4.30%
31.03.2011	363	0.83%	4.10%
30.04.2011	364	0.28%	4.50%
31.05.2011	365	0.27%	4.50%
30.06.2011	370	1.37%	4.20%
31.07.2011	365	-1.35%	4.50%
31.08.2011	352	-3.56%	4.50%
30.09.2011	334	-5.11%	5.20%
31.10.2011	320	-4.19%	5.00%
30.11.2011	310	-3.13%	4.80%
31.12.2011	300	-3.23%	4.20%
31.01.2012	302	0.67%	3.60%
29.02.2012	305	0.99%	3.40%
31.03.2012	305	0.00%	3.50%
30.04.2012	302	-0.98%	3.00%
31.05.2012	289	-4.30%	2.80%
30.06.2012	277	-4.15%	2.40%
31.07.2012	271	-2.17%	2.60%
31.08.2012	271	0.00%	2.50%
30.09.2012	274	1.11%	2.20%
31.10.2012	273	-0.36%	2.60%
30.11.2012	273	0.00%	2.60%
31.12.2012	276	1.10%	2.70%
31.01.2013	283	2.54%	2.70%
28.02.2013	290	2.47%	2.80%
31.03.2013	292	0.69%	2.80%
30.04.2013	290	-0.68%	2.40%
31.05.2013	290	0.00%	2.70%
30.06.2013	290	0.00%	2.90%
31.07.2013	289	-0.34%	2.80%
31.08.2013	289	0.00%	2.70%
30.09.2013	286	-1.04%	2.70%
31.10.2013	283	-1.05%	2.20%
30.11.2013	277	-2.12%	2.10%
31.12.2013	276	-0.36%	2.00%
31.01.2014	275	-0.36%	1.90%
28.02.2014	271	-1.45%	1.70%
31.03.2014	268	-1.11%	1.60%
30.04.2014	265	-1.12%	1.80%
31.05.2014	261	-1.51%	1.50%
30.06.2014	255	-2.30%	1.90%
31.07.2014	254	-0.39%	1.60%
31.08.2014	255	0.39%	1.50%
30.09.2014	255	0.00%	1.20%
31.10.2014	255	0.00%	1.30%
30.11.2014	256	0.39%	1.00%
31.12.2014	256	0.00%	0.50%
31.01.2015	260	1.56%	0.30%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.002224	1

Return	FTSE all share	Return	FTSE 100
2.98%	2.87%	2.98%	-4.15%
2.89%	6.34%	2.89%	3.20%
5.62%	-1.61%	5.62%	6.07%
5.32%	-6.64%	5.32%	-2.22%
4.33%	-4.85%	4.33%	-6.57%
2.42%	6.76%	2.42%	-5.23%
-0.34%	-0.69%	-0.34%	6.94%
1.02%	6.34%	1.02%	-0.62%
2.01%	2.39%	2.01%	6.19%
2.96%	-2.54%	2.96%	2.28%
4.15%	7.03%	4.15%	-2.59%
2.45%	-0.61%	2.45%	6.72%
3.89%	2.05%	3.89%	-0.63%
3.75%	-1.25%	3.75%	2.24%
0.83%	2.85%	0.83%	-1.42%
0.28%	-1.08%	0.28%	2.73%
0.27%	-0.78%	0.27%	-1.32%
1.37%	-2.28%	1.37%	-0.74%
-1.35%	-7.45%	-1.35%	-2.19%
-3.56%	-5.22%	-3.56%	-7.23%
-5.11%	7.78%	-5.11%	-4.93%
-4.19%	-0.87%	-4.19%	8.11%
-3.13%	0.78%	-3.13%	-0.70%
-3.23%	2.63%	-3.23%	1.22%
0.67%	3.78%	0.67%	1.96%
0.99%	-1.35%	0.99%	3.34%
0.00%	-0.60%	0.00%	-1.75%
-0.98%	-7.29%	-0.98%	-0.53%
-4.30%	4.49%	-4.30%	-7.27%
-4.15%	1.24%	-4.15%	4.70%
-2.17%	1.55%	-2.17%	1.15%
0.00%	0.88%	0.00%	1.35%
1.11%	0.85%	1.11%	0.54%
-0.36%	1.35%	-0.36%	0.71%
0.00%	0.92%	0.00%	1.45%
1.10%	6.27%	1.10%	0.53%
2.54%	1.89%	2.54%	6.43%
2.47%	0.93%	2.47%	1.34%
0.69%	0.28%	0.69%	0.80%
-0.68%	2.47%	-0.68%	0.29%
0.00%	-5.30%	0.00%	2.38%
0.00%	6.69%	0.00%	-5.58%
-0.34%	-2.84%	-0.34%	6.53%
0.00%	0.98%	0.00%	-3.14%
-1.04%	4.11%	-1.04%	0.77%
-1.05%	-1.03%	-1.05%	4.17%
-2.12%	1.72%	-2.12%	-1.20%
-0.36%	-3.13%	-0.36%	1.48%
-0.36%	4.87%	-0.36%	-3.54%
-1.45%	-3.03%	-1.45%	4.60%
-1.11%	1.81%	-1.11%	-3.10%
-1.12%	0.97%	-1.12%	2.75%
-1.51%	-1.50%	-1.51%	0.95%
-2.30%	-0.40%	-2.30%	-1.47%
-0.39%	1.50%	-0.39%	-0.20%
0.39%	-2.90%	0.39%	1.33%
0.00%	-0.86%	0.00%	-2.89%
0.00%	2.56%	0.00%	-1.15%
0.39%	-1.69%	0.39%	2.69%
0.00%	2.52%	0.00%	-2.33%
1.56%	1.80%	1.56%	2.79%

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.044361356	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.099272	1

Post-crisis correlations of Liv-ex fine wine 1000

Date	Liv-ex fine wine 1000	Return	Inflation
30.11.2009	204	0.99%	1.90%
31.12.2009	207	1.47%	2.80%
31.01.2010	211	1.93%	3.40%
28.02.2010	215	1.90%	3.00%
31.03.2010	220	2.33%	3.40%
30.04.2010	224	1.82%	3.70%
31.05.2010	229	2.23%	3.30%
30.06.2010	232	1.31%	3.20%
31.07.2010	233	0.43%	3.10%
31.08.2010	235	0.86%	3.10%
30.09.2010	238	1.28%	3.00%
31.10.2010	242	1.68%	3.10%
30.11.2010	247	2.07%	3.20%
31.12.2010	254	2.83%	3.70%
31.01.2011	258	1.57%	4.00%
28.02.2011	264	2.33%	4.30%
31.03.2011	267	1.14%	4.10%
30.04.2011	271	1.50%	4.50%
31.05.2011	275	1.48%	4.50%
30.06.2011	279	1.45%	4.20%
31.07.2011	280	0.36%	4.50%
31.08.2011	273	-2.50%	4.50%
30.09.2011	267	-2.20%	5.20%
31.10.2011	260	-2.62%	5.00%
30.11.2011	255	-1.92%	4.80%
31.12.2011	253	-0.78%	4.20%
31.01.2012	255	0.79%	3.60%
29.02.2012	257	0.78%	3.40%
31.03.2012	257	0.00%	3.50%
30.04.2012	256	-0.39%	3.00%
31.05.2012	251	-1.95%	2.80%
30.06.2012	245	-2.39%	2.40%
31.07.2012	243	-0.82%	2.60%
31.08.2012	243	0.00%	2.50%
30.09.2012	244	0.41%	2.20%
31.10.2012	244	0.00%	2.60%
30.11.2012	245	0.41%	2.60%
31.12.2012	247	0.82%	2.70%
31.01.2013	252	2.02%	2.70%
28.02.2013	257	1.98%	2.80%
31.03.2013	257	0.00%	2.80%
30.04.2013	257	0.00%	2.40%
31.05.2013	257	0.00%	2.70%
30.06.2013	259	0.78%	2.90%
31.07.2013	259	0.00%	2.80%
31.08.2013	259	0.00%	2.70%
30.09.2013	259	0.00%	2.70%
31.10.2013	258	-0.39%	2.20%
30.11.2013	256	-0.78%	2.10%
31.12.2013	255	-0.39%	2.00%
31.01.2014	252	-1.18%	1.90%
28.02.2014	250	-0.79%	1.70%
31.03.2014	250	0.00%	1.60%
30.04.2014	248	-0.80%	1.80%
31.05.2014	246	-0.81%	1.50%
30.06.2014	244	-0.81%	1.90%
31.07.2014	243	-0.41%	1.60%
31.08.2014	243	0.00%	1.50%
30.09.2014	243	0.00%	1.20%
31.10.2014	243	0.00%	1.30%
30.11.2014	243	0.00%	1.00%
31.12.2014	243	0.00%	0.50%
31.01.2015	245	0.82%	0.30%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.099619	1

Return	FTSE all share	Return	FTSE 100
0.99%	4.24%	0.99%	2.90%
1.47%	-3.63%	1.47%	4.28%
1.93%	2.87%	1.93%	-4.15%
1.90%	6.34%	1.90%	3.20%
2.33%	-1.61%	2.33%	6.07%
1.82%	-6.64%	1.82%	-2.22%
2.23%	-4.85%	2.23%	-6.57%
1.31%	6.76%	1.31%	-5.23%
0.43%	-0.69%	0.43%	6.94%
0.86%	6.34%	0.86%	-0.62%
1.28%	2.39%	1.28%	6.19%
1.68%	-2.54%	1.68%	2.28%
2.07%	7.03%	2.07%	-2.59%
2.83%	-0.61%	2.83%	6.72%
1.57%	2.05%	1.57%	-0.63%
2.33%	-1.25%	2.33%	2.24%
1.14%	2.85%	1.14%	-1.42%
1.50%	-1.08%	1.50%	2.73%
1.48%	-0.78%	1.48%	-1.32%
1.45%	-2.28%	1.45%	-0.74%
0.36%	-7.45%	0.36%	-2.19%
-2.50%	-5.22%	-2.50%	-7.23%
-2.20%	7.78%	-2.20%	-4.93%
-2.62%	-0.87%	-2.62%	8.11%
-1.92%	0.78%	-1.92%	-0.70%
-0.78%	2.63%	-0.78%	1.22%
0.79%	3.78%	0.79%	1.96%
0.78%	-1.35%	0.78%	3.34%
0.00%	-0.60%	0.00%	-1.75%
-0.39%	-7.29%	-0.39%	-0.53%
-1.95%	4.49%	-1.95%	-7.27%
-2.39%	1.24%	-2.39%	4.70%
-0.82%	1.55%	-0.82%	1.15%
0.00%	0.88%	0.00%	1.35%
0.41%	0.85%	0.41%	0.54%
0.00%	1.35%	0.00%	0.71%
0.41%	0.92%	0.41%	1.45%
0.82%	6.27%	0.82%	0.53%
2.02%	1.89%	2.02%	6.43%
1.98%	0.93%	1.98%	1.34%
0.00%	0.28%	0.00%	0.80%
0.00%	2.47%	0.00%	0.29%
0.00%	-5.30%	0.00%	2.38%
0.78%	6.69%	0.78%	-5.58%
0.00%	-2.84%	0.00%	6.53%
0.00%	0.98%	0.00%	-3.14%
0.00%	4.11%	0.00%	0.77%
-0.39%	-1.03%	-0.39%	4.17%
-0.78%	1.72%	-0.78%	-1.20%
-0.39%	-3.13%	-0.39%	1.48%
-1.18%	4.87%	-1.18%	-3.54%
-0.79%	-3.03%	-0.79%	4.60%
0.00%	1.81%	0.00%	-3.10%
-0.80%	0.97%	-0.80%	2.75%
-0.81%	-1.50%	-0.81%	0.95%
-0.81%	-0.40%	-0.81%	-1.47%
-0.41%	1.50%	-0.41%	-0.20%
0.00%	-2.90%	0.00%	1.33%
0.00%	-0.86%	0.00%	-2.89%
0.00%	2.56%	0.00%	-1.15%
0.00%	-1.69%	0.00%	2.69%
0.00%	2.52%	0.00%	-2.33%
0.82%	1.80%	0.82%	2.79%

	Column 1	*Column 2*
Column 1	1	
Column 2	0.000860091	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.150223	1

Appendix D: Interview questions

What risks are connected with the investment in fine wine and which one you consider the most serious? And why?

What role do currency movements play in the fine wine industry and how does it affects fine wine prices?

Tell me about the cause of volatility of fine wine prices and how the investor can deal with it?

Which fine wine is the most stable one and why?

Which instruments are used to predict fine wine prices?

Tell me about the performance of fine wine during the financial crisis in years 2007-2008 and what were the key circumstances affecting the prices of fine wine during this period?